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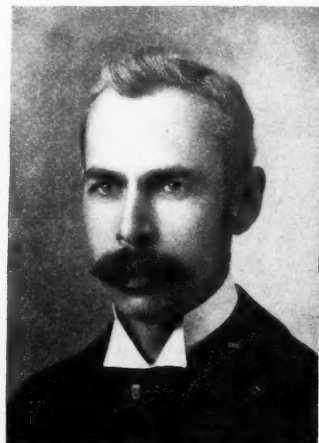
BRICK MAKERS IN CONVENTION.



WM. H. HUNT,
President N. B. M. A.

DURING the week beginning February 11, Old Point Comfort was the Mecca of the paving and building brick manufacturers, those interested in the more advanced study of ceramics and the makers of brick machinery. The occasion was the holding of the annual "Powwow," as they call it, or in other words, the National Brick Manufacturers' Association. The first half of the week was given over to the scientific discussions of the American Ceramic Society, which is practically an offshoot of the older and larger organization, for which reason it holds its annual meetings at the same time, while the latter half was devoted to the interests of the makers of paving and building brick.

There were about 350 present, including the members and their wives and the guests of the organization. The meetings were well attended and the discussions earnest and profitable. Among the leading manufacturers present were D. V. Purington and W. S. Purington, representing the Purington Paving Brick Co., Galesburg, Ill.; C. C. Barr, of The Barr Clay Co., of Streator, Ill.; Charles Ridgely, of the Sangamo Brick Co., Springfield, O.; Grant B. Willis and William Frey, of the Cleveland Brick Co., Canton, O.; G. S. Ettla, of the Clearfield Clay Working Co., Clearfield, O.; John W. Sibley, of the Coaldale Paving Brick Co., Birmingham, Ala.; The Indiana Paving Brick & Block Co.; Charles H. Bray, of the Kessler Brick & Sewer Pipe Works, Helena, Mont.; M. H.



PROF. CHARLES E. BINNS,
President A. C. S.

Dale, of the Scranton Brick & Tile Manufacturing Co., Scranton, Pa.; Fawcett Plumb, of the Streator Paving Brick Co., Streator, Ill.; H. B. Manton, of the Crown Clay Fire Co.; Alfred Yates, of the Johnsonburg Vitriified Paving Brick Co., Johnsonburg, Pa.; U. J. Matson, of the R. M. Matson's Sons & Co., Falls Creek, Pa.; H. C. Dunn, Erie, Pa.; Will P. Blair, of the Terre Haute Brick & Pipe Co., Terre Haute, Ind.; George R. Grimes, Terre Haute, Ind.; J. Parker Fiske, of Fiske & Co., Boston, Mass.; Charles T. Harris of the Celadon Roofing Tile Co., New York City; L. D. Grimes, of the Acme Brick Co., Mariana, C.; E. Rogers, Alton Brick Co., Alton, Ill.; M. E. Gregory, proprietor of Brick Terra Cotta & Supply Co., Corning, N. Y.; James L. Breed, of the New York Brick & Paving Co., Syracuse, N. Y.; Gustav Voelcker, of the Lancaster Front & Hollow Brick Co., Lancaster, N. Y.; Charles Bonner, Chicago Ill.; Thomas Maxwell, of Welch, Gloninger & Maxwell, Pittsburg, Pa.; F. A. Kummer, Catskill, N. Y., and G. F. Monfort, of Good Roads Machinery Co., Kennett Square, Pa.

The American Ceramic Society is a scientific society of a high order, with comparatively a small membership, but intensely interested in its chosen field, and of untold value to the manufacturing brick trade, besides the art and scientific side of ceramics. Its objects are, as stated by its constitution: "To promote the arts and sciences connected with ceramics by means of meetings for social intercourse, for the reading and discussion of professional papers, and for the publication of professional



THEODORE A. RANDALL,
Secretary N. B. M. A.



PROF. EDWARD ORTON, JR.,
Secretary of A. C. S.

literature." Prof. Edward Orton, Jr., of the Ohio University, Columbus, is the father of the society, and has been its secretary from its inception. Prof. Charles E. Binns, director of the New York State School of Clay-Working and Ceramics, was elected the president of the society for the ensuing year, and Prof. Orton was re-elected as secretary.

The new president and secretary of the N. B. M. A. are William H. Hunt, Esq., Cleveland, O., and Theodore A. Randall, of Indianapolis, Ind. The former is largely interested in the clay working industry and will make an ideal president of this organization. He is president of the Builders' Exchange, a director in the Chamber of Commerce, and connected with several of the leading banks of his city. Mr. Randall organized the association more than fifteen years ago, and, while the organization has been of untold value to the manufacturers of the country, he has been the center and circumference of the whole movement.

Hotel Chamberlain is an ideal place for holding conventions. Ample space for committee and session rooms are to be had under the same roof, while the appointments and conveniences which are provided for the comfort and pleasure of guests are all that could be desired.

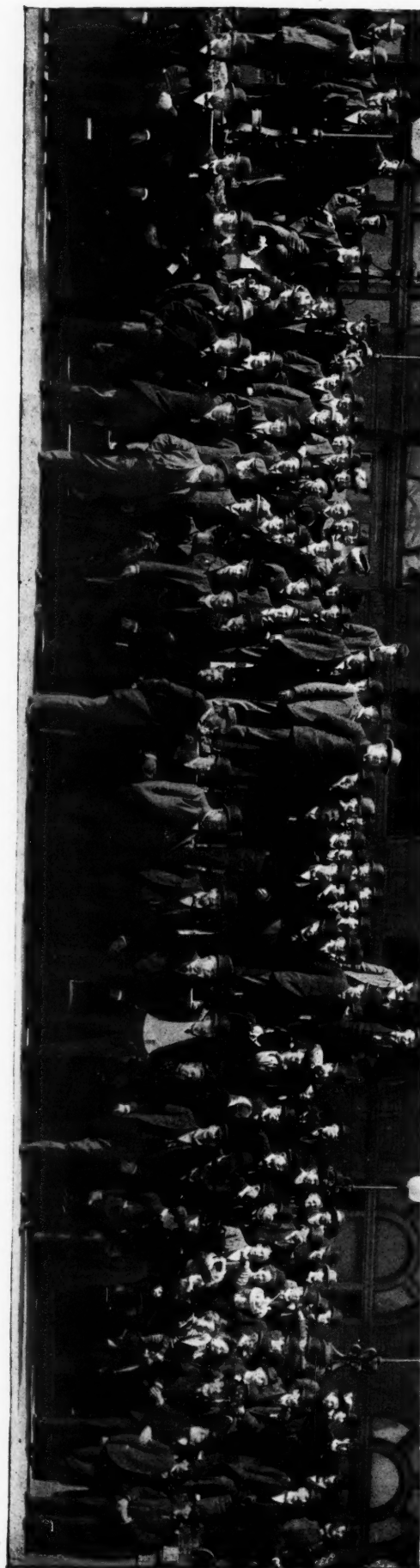
The most important report of the association was that relating to the specifications for laying brick pavements. A committee of three of the most able members of the association have been at work upon this report for the past year, and after due consideration offer valuable suggestions, which will be found elsewhere. The paper on "The Construction of Brick Pavements," to be found in this issue, was contributed by special request by George R. Grimes, C. E., of Terre Haute, Ind. A majority of the brick manufacturers present said that the suggestions contained in this paper of Mr. Grimes, where they have been followed out carefully, have produced the best brick pavements in the world.

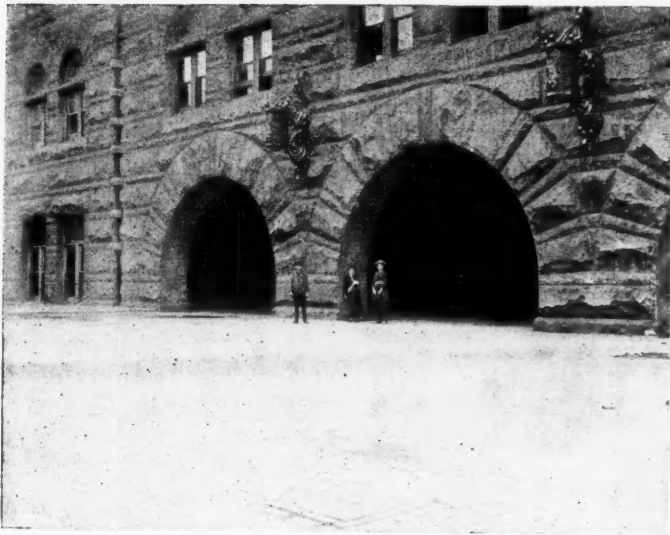
THEY TELL HOW TO LAY BRICK PAVEMENT.

For the past year a committee, consisting of D. V. Purington, of Chicago; W. P. Blair, of Terre Haute, Ind., and T. B. Townsend, of Zanesville, O., members of the National Brick Manufacturers' Association, has been at work upon proposed model specifications for laying brick pavement. The members of the committee do not profess to treat the subject from the civil engineer's standpoint, for they are not in that profession, but their conclusions have been reached after wide observation of actual conditions and long experience in the manufacture of paving brick and in the laying of brick pavement. For these reasons the conclusions reached by this committee will be of especial interest to city and civil engineers. The suggestions offered by the committee are as follows:

"For all streets in cities or large towns a concrete foundation of broken stone and cement of not less than six inches in depth shall be constructed with the surface to conform precisely with that of the finished street. Upon this concrete foundation shall be placed not less than two inches of clean sand, entirely free from pebbles. Preceding the laying of the brick upon this cushion, at either side and next to the curb, should be placed a board one inch in thickness to the height of the brick to be set in the street. This board should remain until after the brick are rolled, when it should be displaced, and in its stead the place should be filled two-thirds with pitch, the remaining one-third should be filled with sand.

NATIONAL BRICK MANUFACTURERS' ASSOCIATION, OLD POINT COMFORT, VA., FEB. 11-16, 1901.





BRICK PAVEMENT AT ENTRANCE OF UNION STATION, ST. LOUIS, MO.—
SUBJECT TO VERY HEAVY TRAFFIC.

"The brick when placed upon this sand cushion should be rolled with a roller not exceeding five tons in weight, and one rolling should succeed another until the brick are brought to an even surface and the sand cushion thoroughly compacted.

"Your committee has very decided convictions in regard to the use of the heavy roller, and is satisfied that it is almost impossible to secure uniformity in the surface and uniformity of compaction of the cushion by the use of a roller heavier than mentioned. It does not think a heavier roller is necessary, and particularly emphasizes this, as but few specifications for brick pavement closely adhere to this requirement.

"The work thus far being accomplished, no accumulation of dirt should be allowed to remain on the surface of the brick, or in the crevices between them, preceding the filling of same with a mixture of cement and sand, which should be in proportion of one to one. This cement filler must be skillfully applied, and requires more attention in its minutest detail than any other portion of the construction.

"The cement and sand must be thoroughly mixed dry, and kept in continual motion from the time the water is being applied until it is swept thoroughly into the crevices of the pavement. It must be mixed so thin that all interstices are completely and perfectly filled. This done, and left absolutely without interference by use or travel until the filler has become thoroughly set, we have our ideal brick street complete, and in durability unquestioned and unmeasured.

"In outlying residence streets in our cities, in towns and villages where the travel is lessened from two thousand and over to five hundred and less daily, such communities can enjoy the luxury of a very satisfactory street, lasting a lifetime, at much less cost. So that, where the travel is reduced, four inches of concrete is sufficient; or where gravel can be had at a minimum cost, even a foundation of gravel with a roadbed properly drained, with sand cushion and sand filler will be found very satisfactory. In the construction of country roadways, a course of good brick, laid flat upon a bed of three inches of gravel and sand, is very desirable where difficulties as to drainage obtain and cheap construction is wished for.

"As we have intimated, it is not our purpose to recommend to this convention a specification in detail for the construction of brick streets. That is scarcely possible to do and make it apply equally well to all the varied conditions with which we meet, but this committee feels that it cannot do better than refer to the paper read before this convention one year ago by engineer George R. Grimes, as embodying the best detail for the construction of brick streets. These details skillfully applied have furnished conclusive proof of the best and most durable construction that has come under the notice and examination of your committee."

WATERLOO, Ind., will soon be lighted by electricity.

CONSTRUCTION OF BRICK PAVEMENTS.

BY GEORGE R. GRIMES, C. E., TERRE HAUTE, IND.*

THE construction of a brick street means an improvement for the public benefit. It means a good, durable, economical and sanitary highway for wheeled vehicles. The character of such a street depends upon the manner of its construction as well as upon the quality of the material used.

As I am to deal only with the manner of construction I will divide the subject as follows: (1) The sub-foundation, commonly called grading; (2) The curb setting; (3) Intermediate foundation of concrete; (4) The sand cushion for the brick; (5) The laying and rolling of the brick; (6) The provision for the expansion and contraction; (7) The filler for the interstices, commonly called grout.

It will be impossible, in this brief space, to bring out all the points relating to the sub-foundation, but the character of the soil, whether it be of sand or clay, is of little consequence. As it is necessary to have all pavements impervious, the sub-foundation can be but little, if any, affected by the element which makes bad roads, moisture.

After the contour of the sub-grade has been determined, which should be as nearly as possible a plain surface, the compacting with a steam roller should be thoroughly done. I have obtained the best results by using a roller weighing from five to eight tons. If a twelve or fifteen ton roller is used the contractor, as a rule, will not pass over the surface more than twice, and often but once. The use of the light roller will be more apt to produce a perfect sub-grade than the use of the heavy roller.

As regards curb setting my practice has been, after the heavy part of the grading has been done, to have the curb stones distributed along the curb lines. Care has been exercised in the digging of the trenches, making ample allowance for the gravel or broken stone foundation eight inches in depth, or concrete mixture of six inches. The concrete foundation is preferable, but a good one can be constructed with gravel or broken stone. Whatever material is employed it should be reinforced in the rear with a wall of the same, six inches thick, and up to within four inches of the top. The essential points to observe are perfect alignment, perfect surface elevation and thorough tamping. The marginal curb, that which sustains the pavement against the unpaved opposing streets, or at either end of the paved street, should always



SOUTH THIRD ST., TERRE HAUTE, IND.—BRICK PAVEMENT LAID IN 1893.



TIPPECANOE ST., TERRE HAUTE, IND.—BRICK PAVEMENT, SIX YEARS OLD, AT ENTRANCE OF "BIG 4" FREIGHT HOUSE.

be set on a concrete foundation, as I have found this to be the only means to prevent the settling which otherwise often takes place. The marginal curb should always be dressed on the top and four inches down on the inside, conforming accurately to the curvature of the street. After the curb is set the sub-grade should be finished, using the top of the curb as a guide.

Next comes the application of the concrete mixture. All permanent pavements should have a concrete sub-structure, for which either screened gravel or crushed stone may be used. The proportions to be followed in the mixing of the sand, cement and stone is too well known to require repeating in this connection.

Before applying the concrete on the sub-grade stakes should be driven, both parallel with and at right angles to the curb line, checking the surface of the sub-grade into five-foot squares. By this means the tamper will have but little difficulty in maintaining the true contour of the cross section, insuring a parallelism between the sub-grade and the concrete. It is important that each section of the work from the sub-grade to the brick course should be parallel.

The tamping of the concrete is best accomplished with a wood tamper, made of a piece of oak timber eight or ten inches square, and about eight inches long, with a round handle five feet long inserted in one end. Nail to the bottom a one and a half or two-inch oak plank, which can be easily removed when worn or rounded at the edges and a new one put on. The concrete thus applied should remain undisturbed from forty-eight to sixty hours before proceeding with the construction. In extremely dry and hot weather an occasional sprinkling is of much benefit.

The better sand for the cushion is of a soft, velvety nature, free from all foreign matter, although a sharp sand can be used. The spreading of the sand should be scientifically done and not delegated to the eye of a laborer with a hand screed. but a template made conforming to the true curvature of the full cross section of the roadway if under thirty feet, and if over thirty feet the same for one-half the roadway.

Having prepared the foundation the brick should be laid perpendicularly to the curb, except at street intersections. Here the best plan is to start at the intersection of the center line of the two streets, and lay at an angle of forty-five degrees toward the curb corner, making a triangular shaped

section of the four quarters, closing them against the perpendicularly laid brick on the curb line of the two streets.

After sweeping the surface the work is ready for the roller, which should start at the center of the street and roll back and forth until the curb is reached, avoiding too close contact with same. The first passing of the roller should not be faster than a very slow walk, so as to avoid giving the careened position to the brick. After the brick have been thoroughly imbedded in the sand cushion by the slow rolling process, the speed of the roller may be materially increased. The longitudinal rolling should be followed by transverse rolling from either side, at an angle of forty-five degrees from curb to curb.

To allow for the contraction and expansion there should be applied between the ends of the brick and the curb on either side of the roadway a cushion of asphalt or No. 6 pitch, applied in the liquid state. This is all the provision necessary to overcome the objectionable feature of expansion, except that all brick should be laid during a summer temperature, when the maximum expansion is reached. The longitudinal contraction and expansion may be treated in a similar manner by applying the asphalt cushion at stated distances, thus dividing the roadway into sections.

The most important element in the construction of a brick pavement is the filler, upon the proper application of which depends the beauty and durability of the pavement. The cement filler is the best and none other should be used. The mixing and application of the cement filler needs the most careful and intelligent attention. It is assumed, of course, that only the best material will be used. The sand should always be clean, sharp and dry, and in that state mixed with an equal part of Portland cement until the mass assumes an even and unbroken shade. Then water enough should be added to make the mixture of the consistency of rich cream, and from the time the water is applied until the last drop is floated over the brick it should be kept in motion, never allowing the mixing to rest. Thus finished, the work should never be subjected to any disturbances and not opened for traffic for from seven to ten days after its completion.

* A majority of the brick makers who attended the recent session of the National Brick Makers' Association at Old Point Comfort, declared that Mr. Grimes had laid the best brick pavement in the world in his own city, Terre Haute, Ind., and for that reason he was asked to prepare the above article on the construction of brick pavement.—[EDITOR OF M. J. & E.]



NORTH CLEVELAND ST., CANTON, O.—BRICK PAVEMENT.

WOODEN PAVEMENT IN THE UNITED STATES.

	Wooden block pave- ment, sq. yds.		Wooden block pave- ment, sq. yds.
Atlanta, Ga.....	7,300	Milwaukee, Wis.....	1,427,527
Binghamton, N. Y....	7,937	Minneapolis, Minn...	1,036,191
Buffalo, N. Y.....	742	Mobile, Ala.....	105,600
Chicago, Ill.....	15,264,200	New Orleans, La.....	1,000
Cincinnati, O.....	2,300	New York, N. Y.....	1,408
Cleveland, O.....	7,300	Omaha, Neb.....	381,457
Covington, Ky.....	4,300	Portland, Ore.....	38,965
Dallas, Tex.....	173,335	Rochester, N. Y.....	17,377
Des Moines, Ia.....	15,000	Rockford, Ill.....	22,220
Detroit, Mich.....	3,721,717	Saginaw, Mich.....	348,510
Dubuque, Ia.....	1,262	San Antonio, Tex....	53,000
Duluth, Minn.....	470,976	Seattle, Wash.....	1,144
Elizabeth, N. J.....	120,595	Sioux City, Ia.....	347,835
Elmira, N. Y.....	8,204	South Bend, Ind.....	60,385
Fort Wayne, Ind.....	219,615	Springfield, Ill.....	70,400
Galveston, Tex.....	205,000	Springfield, O.....	750
Grand Rapids, Mich..	182,741	St. Joseph, Mo.....	5,328
Houston, Tex.....	96,448	St. Louis, Mo.....	148,007
Indianapolis, Ind.....	218,768	St. Paul, Minn.....	559,503
Joliet, Ill.....	13,875	Superior, Wis.....	1,393,000
Kansas City, Kans....	294,618	Tacoma, Wash.....	70,500
Kansas City, Mo.....	78,253	Toledo, O.....	277,762
Lincoln, Neb.....	177,817	Topeka, Kans.....	38,000
Memphis, Tenn.....	35,340		

BRICK PAVEMENT IN THE UNITED STATES.

	Brick pavement, sq. yds.		Brick pavement, sq. yds.
Akron, O.....	334,990	McKeesport, Pa.....	301,044
Albany, N. Y.....	281,104	Memphis, Tenn.....	127,442
Allegheny, Pa.....	223,540	Milwaukee, Wis.....	37,540
Allentown, Pa.....	5,160	Minneapolis, Minn...	79,746
Altoona, Pa.....	13,160	Mobile, Ala.....	88,000
Atlanta, Ga.....	36,000	Nashville, Tenn.....	39,078
Auburn, N. Y.....	30,000	Newark, N. J.....	79,411
Baltimore, Md.....	17,447	New Haven, Conn....	36,829
Binghamton, N. Y....	27,682	New Orleans, La....	129,000
Birmingham, Ala....	3,926	New York, N. Y.....	565,680
Boston, Mass.....	5,375	Norfolk, Va.....	33,280
Bridgeport, Conn....	7,925	Omaha, Neb.....	233,068
Buffalo, N. Y.....	121,602	Paterson, N. J.....	73,499
Cambridge, Mass....	10,560	Pawtucket, R. I.....	1,965
Camden, N. J.....	23,800	Peoria, Ill.....	522,649
Canton, O.....	229,435	Philadelphia, Pa....	1,936,965
Chattanooga, Tenn...	86,764	Portland, Me.....	348
Chelsea, Mass.....	4,200	Portland, Ore.....	16,405
Chicago, Ill.....	590,200	Providence, R. I....	7,421
Cincinnati, O.....	435,401	Quincy, Ill.....	807,059
Cleveland, O.....	1,173,000	Richmond, Va.....	12,000
Columbus, O.....	1,609,274	Rochester, N. Y....	119,313
Covington, Ky.....	11,600	Rockford, Ill.....	45,830
Dallas, Tex.....	7,745	Saginaw, Mich.....	129,536
Davenport, Ia.....	467,684	Savannah, Ga.....	23,212
Dayton, O.....	302,673	Scranton, Pa.....	30,827
Des Moines, Ia.....	1,522,365	Seattle, Wash.....	50,430
Detroit, Mich.....	598,971	Sioux City, Ia.....	90,844
Dubuque, Ia.....	115,810	South Bend, Ind....	291,570
Elmira, N. Y.....	48,660	Spokane, Wash.....	5,500
Erie, Pa.....	124,750	Springfield, Ill....	404,800
Evansville, Ind.....	541,233	Springfield, Mass....	40,322
Fort Wayne, Ind.....	183,399	Springfield, O.....	115,187
Galveston, Tex.....	8,437	St. Joseph, Mo.....	112,158
Grand Rapids, Mich..	64,275	St. Louis, Mo.....	496,207
Harrisburg, Pa.....	6,413	St. Paul, Minn.....	64,213
Holyoke, Mass.....	31,933	Syracuse, N. Y.....	165,437
Houston, Tex.....	136,613	Tacoma, Wash.....	2,000
Indianapolis, Ind....	405,328	Terre Haute, Ind....	126,226
Jersey City, N. J....	9,386	Toledo, O.....	720,777
Johnstown, Pa.....	152,733	Topeka, Kans.....	129,000
Joliet, Ill.....	85,091	Trenton, N. J.....	120,997
Kansas City, Kans....	318,972	Troy, N. Y.....	91,861
Kansas City, Mo.....	609,356	Utica, N. Y.....	1,788
Knoxville, Tenn.....	97,000	Washington, D. C....	13,903
Lancaster, Pa.....	50,344	Waterbury, Conn....	12,224
Lincoln, Neb.....	374,703	Wheeling, W. Va....	321,745
Little Rock, Ark.....	39,100	Wilkesbarre, Pa....	92,602
Los Angeles, Cal.....	11,401	Wilmington, Del....	196,613
Louisville, Ky.....	928,560	Worcester, Mass....	4,050
Lowell, Mass.....	2,000	Youngstown, O.....	60,856
Lynn, Mass.....	2,493		

THE EUGENE FIELD SCHOOL.

BY ALVIN D. REED, ST. LOUIS.

THE last school finished for the Board of Education of the city of St. Louis is the Eugene Field School, which was opened January 28, 1901. It is one of the best appointed and equipped school houses in St. Louis, and will serve as a model for the entire country for perfect school house architecture. In it are embodied all the most approved principles for hygiene and comfort, and the latest devices for ventilation, heating, lighting and sanitation.

The plans for the school were prepared by William B. Ittner, Commissioner of School Buildings, and were faithfully carried out by Hiram Lloyd at a cost of \$120,000.



EUGENE FIELD SCHOOL, ST. LOUIS.

The building is three stories in height with a large, high basement, built around a court opening to the north, against which are placed the corridors and stair towers. It is faced with mottled brick, crowned with an overhanging tile roof of low pitch, and is absolutely fireproof throughout. The basement contains large play rooms, which will be opened in the mornings in advance of the class rooms, for the accommodation of early arrivals. Opening out of the play rooms and yard are large, well lighted toilet rooms. The remainder of the basement is occupied by the vestibules, boiler, engine, fan, and coal rooms. The coal rooms open on the alley in the rear of the school, allowing the fuel to be delivered and stacked directly from the wagons; an arrangement at once cleanly and convenient.

The first floor contains six class rooms twenty-five by thirty-two feet, a kindergarten room thirty by fifty-one feet, the principal's office, and a store room. The class rooms have been planned with a general view to the accommodation of not more than fifty-five pupils in each, the usually accepted theory being that any number greater than this is an exhausting tax upon the energies of the teacher, and a bar to rapid promotion. The desks which will be used in the rooms, are about two feet wide. These will be arranged in six rows, with aisles eighteen inches wide. Two and one-half feet will be allowed for the aisles next the windows, and three feet for the aisle at the inner side of the room. This will allow a space of seven feet for the teacher. Arranged on this basis, each pupil will be given fifteen and one-half square feet of floor space, and as each room has a clear story height of thirteen and one-half feet, there is an allowance to each of 204 cubic feet of air space. With the modern system of ventilation installed, however, the cubic feet of air space per

pupil is not such an important factor, since the entire air of the room may be changed as often as is desired.

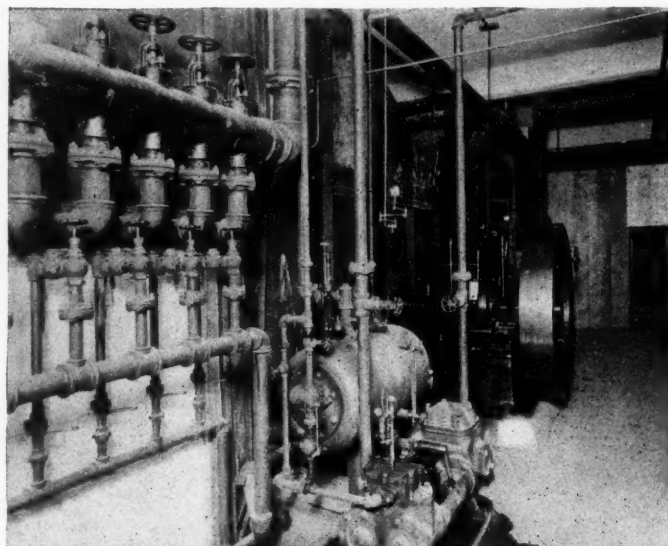
The second and third floors contain seven class rooms each, of the same dimensions as those on the first floor, a teachers' room and store room, teachers' toilet and emergency toilet room. The class rooms are lighted principally from one side, and in such a way that the maximum, if not all the light, comes from the left hand side of the pupil. In this manner cross lights and their consequent shadows are avoided.

The quality of light in the rooms is greatly modified by the colors used on the walls and ceilings. Soft shades of green, buff and blue have been found most satisfactory, and bright colors are avoided. Warm colors are placed in the north rooms, and cooler tints in the south rooms.

Opening out of each class room is a well lighted wardrobe, through which the rooms are ventilated. Each class room contains a bookcase built flush in with the wall. Blackboards of natural slate occupy much of the wall surface. The finish of the rooms is in hardwood, and is as simple as possible. All superfluous mouldings are omitted. Cement plaster takes the place of wood wherever possible. Most of the rooms are provided with a picture moulding, and there are a few small bracket shelves in each room.

The floors throughout the building are of hard maple, laid in narrow strips and driven up absolutely tight. They have

been treated with two coats of linseed oil, applied hot, and have a six-inch marble border and a base in the hallways. Leather covered doors, hung with a checking floor hinge,



ENGINE AND FAN ROOM—EUGENE FIELD SCHOOL, ST. LOUIS.

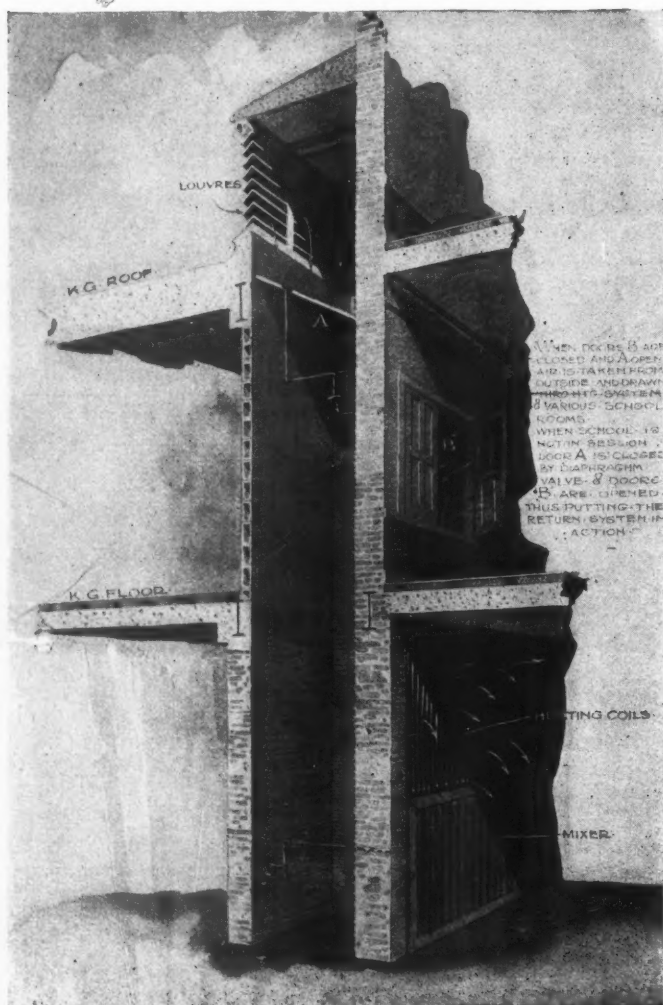
open into the corridors, and do away with noise from slamming doors.

Each room and the hallways have a geometrical stenciled frieze, and all the walls and ceilings above the basement will be painted in oil. The finish throughout the building is of oak. The stairways have steps of easy rise, without windows, and are provided with strong handrails at balustrade and wall. The treads are made of an iron box filled with concrete and finished with a top of asphalt. This has the advantage of being noiseless, as well as non-slipping, and when the treads are worn they can be taken out, melted and replaced at small cost.

The heating and ventilating plant for this school was designed by myself, and the contract for the work was awarded to the Karr Supply Company, heating and ventilating contractors of St. Louis. The fan, engines and coils were furnished by the Buffalo Forge Company, of Buffalo, N. Y. The plant has one horizontal return tubular boiler 22 feet long and 72 inches diameter; one 18 x 12 inch engine, directly connected to the fan wheel shaft—wheel 11 feet diameter, the fan having two top horizontal discharges.

The fresh air is drawn to the fan through the openings provided for the purpose. Between the fan and these openings are placed two tempering coils with by-pass doors under the tempering coils. These by-pass doors are opened and closed automatically by thermostats to keep the temperature of the air entering the fan at 65° Fahr. One-half of this air is then discharged from each end of the fan, either through or beneath sets of heating coils. The air discharged through heating coils enters what we call a "hot room." Should the air be discharged below the heating coils, it enters the "tempered air room." Thus we have air at two temperatures ready to enter the galvanized iron ducts leading to the class room.

The ducts are connected to the hot and tempered air room by double dampers. Thermostats located in the various class rooms control the double dampers, so the air is admitted to



METHOD OF HEATING WITHOUT VENTILATION—EUGENE FIELD SCHOOL, ST. LOUIS.

the ducts from either the hot room or the tempered air room, as may be needed to keep the temperature of the class room at 70° Fahr.

A cut is here shown of a very ingenious arrangement for warming the building when unoccupied for school purposes, such as early in the morning, etc., and is put in operation as follows: The vent registers in all the wardrobes are closed; the class room doors leading to the hall are left open. The doors marked "B," shown in the cut, which open into the hall, are left open. The door "A," which admits fresh air from outside, is closed; then the air is put in complete circulation, or it is forced into the class rooms, and from there into the halls; and as it cools, drops down through the large and spacious stairways into the first floor hall, where it passes down through doors "B" and passageways to the basement; thence to the fan, where it is again forced through the coils into the hot room, and from here to the class rooms. This by-pass arrangement is a very great saving in fuel, and enables the janitor to keep the building warm with about twenty-five or thirty revolutions of the fan per minute; and in very cold weather the building can be warmed in thirty minutes.

The fresh air openings into the class rooms are all on the inside walls, thus always discharging the warm air toward the outer walls and glass surface. These openings are nine feet above the floor, and have a free opening of five square feet in place of register faces. A diffuser is used on each fresh air opening to give an even current of air over the entire surface of the room. This avoids any draughts, none being perceptible in any part of the room.

All vent registers are located in the wardrobes, about eight inches above the floor. This has been found to give excellent service, as a current of air is always flowing through the wardrobes. When the pupils, in coming to school, get their wraps more or less wet by the snow or rain, these are always found dry and warm, because of the air passing through and around them, as described above.

The bases for these coils were designed by myself as being especially necessary for low pressure school house work. The circulation of steam is most complete, as with the fan in operation, and with only one pound pressure on the coils, not a single foot of pipe was found air bound. Each of these sections contained 1,022 feet of one-inch pipe, or 2,044 feet was used as tempering coils, and 5,110 feet in each set of heating coils, making a total of 12,264 feet of one-inch pipe for heating the entire building.

There is no direct radiation in the building, and the entire heating apparatus for the building is located in what is known as the fan and engine room. Each coil is provided with its own valves in the steam and return pipe, with check and drain valves. Here, in order to reduce the number of joints, and the consequent liability of leaks, a special form of header was designed.

Steam at boiler pressure is used for operating the engine. The exhaust steam, after passing through a separator, enters the main header, and from this header to the heating and tempering coils. Whatever steam is needed in addition to the exhaust, is taken from the boilers through a "special" low pressure, noiseless reducing valve, and during the cold-est weather this winter we have not had to carry more than

one and one-half pounds on the coils, and have had only four of the five heating coils in use.

The condensation from the coils flows by gravity to the receivers, where it is pumped back to the boiler. Whatever water is wasted through the drip pipe, or blown off from the boiler, is made up by admitting water from the hydrants to the receiver, where it is heated before being pumped into the boiler.

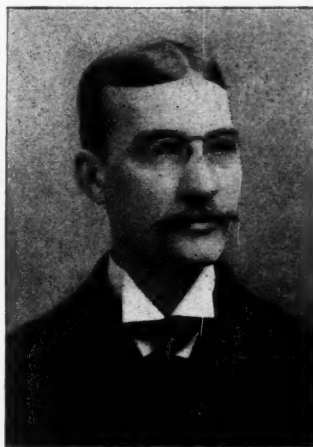
Under the boilers is used the cheapest grade of Illinois coal, and this boiler, as well as most of the other boilers in the schools, is equipped with a special form of rocking and dumping grate bar, designed by myself. They have given better satisfaction and cost much less than any other grate bar that has been tried.

The contractor's guarantee called for 59,600 cubic feet of fresh air per minute, and the speed of the fan was limited to 115 revolutions per minute. A careful test of the plant with the fan running at 115 revolutions per minute, showed that 67,600 cubic feet was delivered, thus exceeding his guarantee by 8,000 cubic feet. The cubic feet of space in the building to be heated and ventilated is 416,800, or a complete change of air every six and one-quarter minutes. Although comparatively new, the plant has been inspected by a number of heating and ventilating experts from several other cities, and, as they say, must be seen to be appreciated.

The sides of the fan, the housings and casings of the coils, and hot and tempered air rooms, the engine pumps and receiver, are painted and finished in white enamel, touched up with gold. All pipes are covered and painted pure white. The walls and ceilings are finished in white, so one must draw on his imagination for an engine and fan room in a modern school house which is not only useful but ornamental and instructive.

THE NATIONAL MUNICIPAL LEAGUE.

BY HON. CLINTON ROGERS WOODRUFF, PHILADELPHIA.



HON. CLINTON ROGERS WOODRUFF,
Sec'y National Municipal League.

THE National Municipal League was organized in May, 1894, "to multiply the numbers, harmonize the methods and combine the forces of all who realize that it is only by united action and organization that good citizens can secure the adoption of good laws and the selection of men of trained ability and proved integrity for all municipal positions, or prevent the success of incompetent or corrupt candidates for public office; to promote the thorough investigation and discussion of the conditions and details of civic administration, and of the methods for selecting and appointing officials in American cities, and of laws and ordinances relating to such subjects; to provide for such meetings and conferences and for the preparation and circulation of such addresses and other literature as may seem likely to advance the cause of good city government."

In the autumn of the same year the American Society of Municipal Improvements was organized "to disseminate information and experience upon and to promote the best methods to be employed in the management of municipal departments and in the construction of municipal works, by means of annual conventions, the reading and discussion of papers upon municipal improvements, and by social and friendly intercourse at such conventions, and to circulate among its members by means of an annual publication, the information thus obtained."

In the autumn of 1897, the League of American Municipalities was formed to promote "the general improvement and facilitation of every branch of municipal administration by the following means: (1) The perpetuation of the organization as an agency for the co-operation of American cities in the practical study of all questions pertaining to municipal administration; (2) The holding of annual conventions for the discussion of contemporaneous municipal affairs; (3) The establishment and maintenance of a central bureau of information for the collection, compilation and dissemination of statistics, reports and all kinds of information relative to municipal government."

These three organizations, each in its chosen way and each in its chosen field of activity, have been at work upon the solution of the great problem of American municipal government. Originally organized without reference one to the other, there has been a gradual approach to a mutual understanding, and it is the belief, as well as the wish of many, that there should be evolved a plan of active co-operation among them in support of measures which they all favor. Amalgamation and absorption are out of the question; but there is no apparent reason why they should not work together as three harmonious corps of a single army so far as their objects are similar.

In this connection, and as a means to a better understanding, it may not be out of place to consider briefly the work attempted and accomplished by the oldest of the three bodies. Thus far, in addition to the original meeting in Philadelphia, conferences for good city government have been held under the auspices of the National Municipal League in Minneapolis, Cleveland, Baltimore, Louisville, Indianapolis, Columbus and Milwaukee. Another will shortly be held in Rochester. These conferences have served as annual reunions of those devoting their time, attention and energies to the solution of municipal problems. As I have said, in another connection "officials, students and public spirited citizens have met upon common ground to exchange views and experiences. In fact, the League grew out of the imperative need for such interchanges. Previous to the Philadelphia Conference in 1894, each community was working out its local problems as best it might, without much, if any, thought as to what was going on elsewhere."

These meetings have proved of incalculable advantage and great good has followed. If it were pertinent to this article, extended references might be made to successful reform movements having their inspiration and inception in the League's activity. The "Municipal Program," which has been highly praised, alike by practical administrators, students and economists, is the work of the League's special committee on the subject. Similar committees

are now at work upon the subject of uniform municipal accounting, and upon the question of instruction in municipal government in American educational institutions. It is reasonable to expect that these two committees will accomplish as much along their particular lines as their predecessor did in connection with the subject of a municipal corporation act.

It is a noteworthy fact that during the past year nearly every movement for the improvement of municipal charters has drawn very largely upon the ideas advocated in the "Municipal Program" and endorsed by the National Municipal League.

These concrete accomplishments, however, by no means measure the usefulness of the League. Its influence upon public opinion in municipal matters cannot be even remotely estimated. We have no sure means of calculating how effective an educational movement has been or is. At best we can only indefinitely approximate it. The chief aim of the League has been to create sound public opinion in municipal affairs; to raise municipal standards; to indicate the best methods. That it has succeeded in these directions, is now generally conceded; but naturally not to the extent desired. Public sentiment is formed but slowly; indeed, if formed too rapidly is liable to be evanescent.

There is now a strong and growing group of men in the United States whose conceptions and ideas of municipal government have been developed and harmonized by the League, and whose activities have been guided to effective ends. Where once there was spasmodic and isolated effort, there is now intelligent co-operation. This is of itself a great gain; a fact of no mean importance.

One of the great difficulties in the past in solving the municipal problem has been found in the indifference of the citizens and the lack of municipal ideas and ideals. To overcome these particular difficulties may be said to be the chief aim of the National Municipal League.

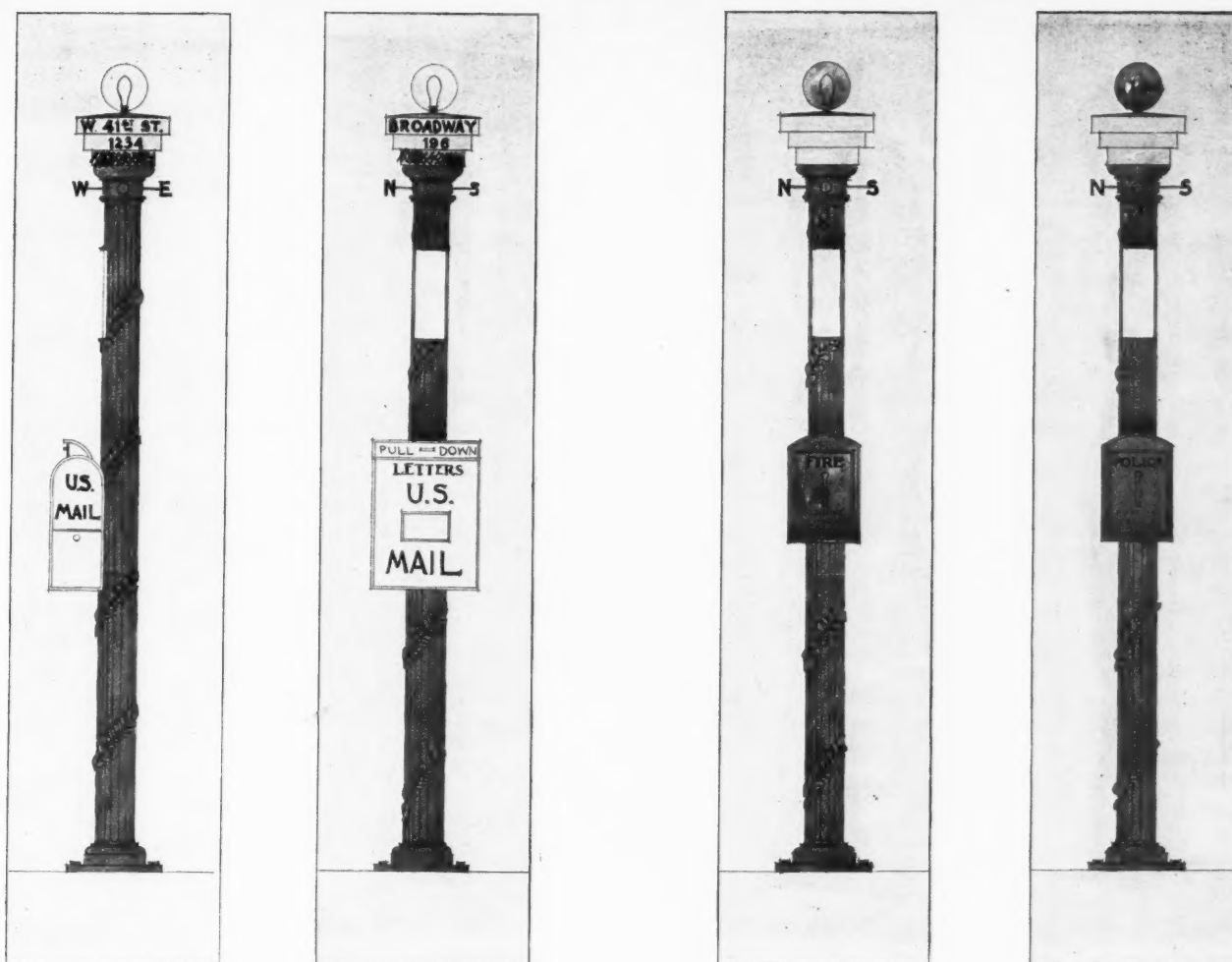
MUNICIPAL STREET SIGNS.

BY ELMER LEE, A. M., M. D., NEW YORK

LIKE the paging of a book, street signs are a necessity. Adequate attention to this important matter has already been long delayed. Prominent citizens believe steps should be taken to secure for this city a perfect system of street signs. Several suggestions have recently appeared in the newspapers. No one questions the need for better street signs. Under the progress of electric street lighting, the corner gaslight post and its street sign is falling into neglect. The present electric light posts afford no promise of usefulness as street sign carriers. The posts are in no manner suited to the requirements. Even the improved Welsbach street lamps offer poor accommodations for signs.

The first requirement of a satisfactory system is uniformity. All street markings should be of exactly the same style. They should be invariably located on the same relative sites. The design should be adapted to its purpose. It should be attractive and durable. It should be as far as possible out of the way of destruction by vehicles in the street.

The designs here illustrated meet these important requirements. They also provide for the letter boxes, fire and police service. Provision is also made for small drinking fountains of the most approved sanitary type, thus accomplishing with regularly placed and handsome standards or posts a solution to a vexed municipal problem. The Government stands in great need of corner posts for the letter boxes. Hanging letter boxes, according to the present fashion,



ADAPTED TO P. O. BOX.

ADAPTED TO POLICE AND FIRE BOXES.

PROPOSED DESIGNS FOR STREET SIGNS.

to antiquated and neglected lamp posts is out of date for a city of the size of New York.

The first item of importance is the selection of the site on which the standards are to be placed. By my plan, a post is to be planted, or otherwise secured, at the northeast and the southwest corners. The post to be situated on the building line of the north and south streets, where such line intersects the curb line of the cross streets. The idea is to move it back from the street corner. It is equally useful and less likely to be destroyed by vehicles turning the corners. Slight variations from this plan are necessary at certain street intersections. But the plan holds good for the most part. The post is strong and handsome. It is eight feet high.

At the top it is capped with two or more doric designs. On the four edges of the top piece appear the street names. The name of the street would be in cast letters with white faces. The corresponding house number appears on the edge of the square beneath the street name. It is not to be illuminated. It is intended to be read from reflected light. It is a street sign post, and not a lamp post. It is not so high but that it could be read by going up to it if it be at night and the light poor. It would always be there to one looking for the street sign.

The next important item is to provide for the fire and police boxes. The adaptation is apparent. Posts having a fire signal box would have a red globe by day and a red light by night. For police boxes the globe would be green by day and a green light by night.

The post office department is always embarrassed for the lack of suitable posts for letter boxes. This system in first providing the necessary street signs, also supplies sufficient facilities for fire, police and letter boxes. The post in the design shows the improved method of attaching the letter box. It is secured firmly by two bolts passing into the threaded holes of the post from the inside of the box.

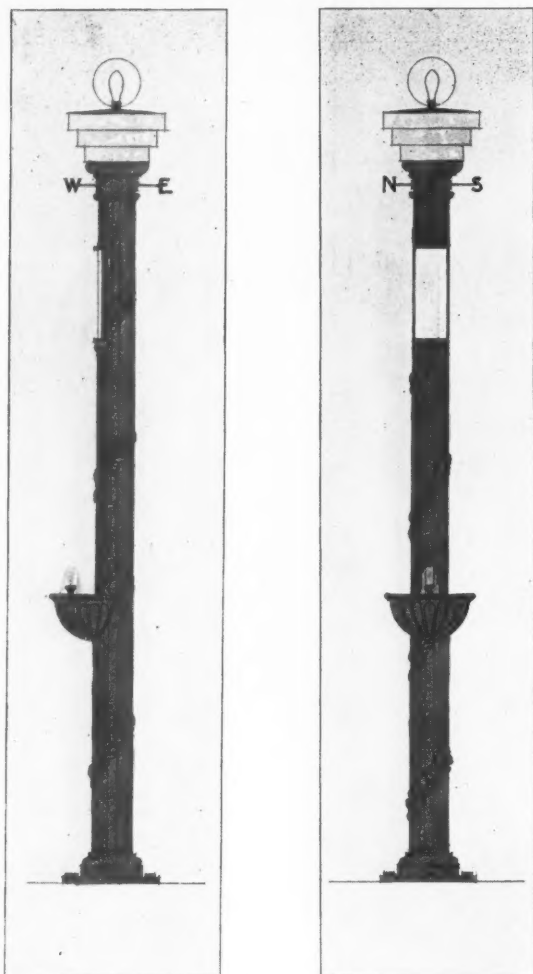
My designs also show an improved letter box. The slot or opening for letters is in front. It has "no lift up" or "pull down." It is waterproof and safe. Ladies find the present boxes very inconvenient. This is especially the case in rainy and stormy days. It requires one hand to "pull down," one to introduce the mail, and another hand is needed for the umbrella. The contracts for the supply of letter boxes is made once in four years. The next award for the ensuing term of four years is to be made this coming June. This style of letter box, as shown, is the best and the most easily operated.

Drinking water, at convenient intervals, is an absolute need in a large city. It is a very difficult thing to find such conveniences in this city. The expense of adding a drinking fountain to the sign post is justified by its usefulness. Roughly estimated, it would require 50,000 or more posts to serve New York proper.

The expense would be not far from \$1,000,000. The public is interested and requires plain street signs. No publisher would think of omitting the numerals at the head of the pages of a book. None the less imperative is the importance for well ordered and sightly street signs. If it requires a million dollars, it is well worth all its costs. Street signs are a necessity, and should be provided at any reasonable outlay.

The standard, as illustrated, is designed to be of cast iron, painted either green or some desirable color. It is not so tall as the old lamp posts. The height is eight feet, or just tall enough to be easily seen above the heads of pedestrians. The post may be tastefully decorated with an ivy vine, as seen in the drawings, or by other devices.

The whole number of posts required would furnish enough for fire, police and letter boxes, and others for the occasional drinking fountain. It would do away with the unsightly variety of means now employed for these several purposes. A city of the importance of



PROPOSED DESIGNS FOR STREET SIGNS—ADAPTED TO SANITARY DRINKING FOUNTAIN.

New York is entitled to the best possible street sign system. It is at once the comfort of the stranger and the useful necessity of the entire population.

It is not so much that street signs be highly illuminated by night as it is to place such signs in legible letters at regularly selected sites where they can always be found by such as need to use them. By the extensive system of municipal lighting, there would be few corners that would not have enough light by which to render a legible sign useful. People will find a way to read the street sign if there is one there to read. The illustrations also show the points of compass attached to a collar at the top. This is a detail, and may or may not find favor. We are a little slow to act, it is sometimes said, but in the end New York is certain to have the best municipal improvements and institutions.



—Boston is to have a new subway, and the general public favors city control of the improvement.

—A municipal greenhouse is successfully conducted by the cemetery board of New Bedford, Mass.

—A bill regulating the speed of automobiles on country roads has been passed by the New York legislature.

—Colorado Springs, Col., has been raised to a city of the first class by recent action of the legislature.

—The city budget of Chicago for the current year amounts to \$27,300,000; not quite one-third that of New York.

—Allegheny (Pa.) City Councils recently passed an ordinance providing for Sunday concerts in Carnegie Music Hall for the ensuing year.

—By abolishing some needless inspectors, overseers, extra workmen and teams the street cleaning department of Columbus, O., saved over \$18,000 in 1900.

—A Tammany Assemblyman has introduced a bill in the legislature which provides for the installation of a municipal printing plant in Greater New York.

—The city of Savannah, Ga., levies annually an occupation tax of \$100 per mile and \$25 per car on its street railway companies. Atlanta derives no revenue from this source.

—Strange to say, Boston is the only city of its class in the country which does not own a zoo. While the city has as fine a park system as will be found anywhere, it lacks this feature.

—The rock bottom price for street work has been struck in San Francisco; a local company has offered to lay bitumen for 15½ cents per square foot, and asphaltum for 18¾ cents per square foot.

—A bill has been introduced in the legislature which authorizes the pensioning of the disabled members and such as have served the requisite number of years in the New York street cleaning force.

—The Board of Public Service of Cincinnati has authorized the erection of a \$12,000 stable for the use of the water department. At present \$1,600 per annum is being paid for the rent of stable room.

—Pittsburg, Pa., proposes to place the entire force of 2,500 employees of the department of public works under the control of the City Councils. At present the whole matter is under the control of the department.

—Ever since the completion of the Chicago drainage canal, St. Louis and other cities down the Mississippi have been howling about the pollution of the river by the sewage of the Windy City. The report of the commission which has been at work upon the matter recently demonstrated the objections to be groundless, as the water purifies itself before reaching the cities concerned.

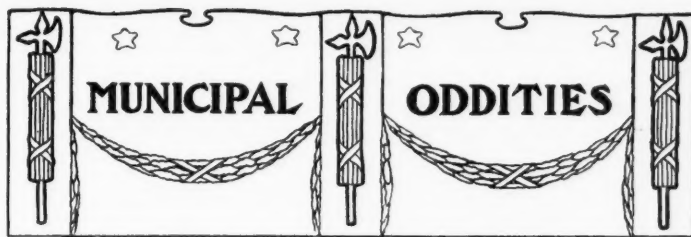
—Work on the new East River Bridge No. 3 will soon commence. Bids have been advertised for providing for the construction of the Brooklyn tower. The work will consist of the sinking by the pneumatic process to a depth of about ninety-four feet below the mean high water mark of a caisson, and the building thereon of a masonry pier. The caisson will be of timber, and measure 78 by 144 feet. It will be 55½ feet high. It will be supplemented by a coffer dam about 44 feet high.

—The Columbus street railway franchise question has been settled at last. The franchise, as passed, provides for a cash fare of five cents, with seven tickets for twenty-five cents. Universal transfers are to be given on all lines of the company, and transfers are to be given to the interurban lines on a cash fare. When the gross receipts of the company reach \$1,750,000, eight tickets are to be sold for twenty-five cents. No franchises are to be forfeited for any cause, and there is to be no waiver of the perpetual franchise grants.

—Work on the new bridge which is to span the East River is progressing rapidly. The approaches to the new bridge will be longer than those of the old, and the total length of the bridge will be 7,200 feet, as compared with 6,000 feet of the old. Instead of expensive masonry, as on the old bridge, the approaches of the new will be built of steel and can be completed in less time and at much less cost. The total cost of the approaches will be \$2,500,000. The bridge provides for four trolley tracks, two elevated railroad tracks, two roadways, footwalks and bicycle paths. About 500 buildings will be destroyed to make room for the bridge, and the total cost will amount to more than \$8,000,000.

FORTUNATE IN POINT OF COMFORT.

THESE two things (no smoke, no dust) are of unusual interest to the traveler through New York State on the Lackawanna Railroad, for the reason that on no other road in the United States is there stronger incentive to keep one's eyes upon the passing scene. It is said of this line truthfully, that every mile is picturesque. It traverses the agricultural region of western New York, the valley region of central New York, the mountain region of Pennsylvania and New Jersey, and every mile offers a view that is beautiful, interesting and entrancing. In point of comfort its passengers are particularly fortunate, for, in addition to there being no smoke or dust, the cars are roomy, comfortable and scrupulously clean. Sleeping-cars, parlor-cars and dining-cars offer all the conveniences and comforts of modern travel.—Printer and Bookmaker.



—Common report has it that a Chicago policeman wore the uniform for twenty-seven years, and in all that time made only one arrest.

—The town of Molson, Wash., has the unique distinction of being in the hands of a receiver. The condition is the result of a petition signed by three creditors who hold claims aggregating \$3,000.

—The sheriff of Jefferson County, New York, has provoked a storm of criticism by the purchase of two bloodhounds, to be used in tracking convicts who escape from the chain gang. The Mayor of Canton, O., the President's own city, not many months ago, purchased two bloodhounds for the same purpose, but no one in that vicinity criticised him for it.

—A Pittsburg hotel clerk recently won a bet of \$25 on the statement that he could name a city which had a population of more than 125,000 that did not have a daily paper nor a theatre. Allegheny, Pa., was the city named. Owing to its close proximity to Pittsburg, the city has never been able to support either a daily paper or a theatre, although the attempt has been made several times.

—A Chicago alderman proposes to have the votes of the legislative body recorded by electricity. The plan involves the arrangement of an electric register attached to the wall in the vicinity of the mayor's chair and controlled by buttons placed on the desk of each alderman. After the name of each legislator would be ample space for the words "yea" and "nay," so that when a vote was to be recorded upon any question each alderman's wish could be expressed by a simple touch of the button.

—All sorts of municipal ventures are tried by English cities. The latest is the ownership of a huge rabbit warren by the city of Torquay. The city became the owner by a recent purchase of 2,000 acres of land which constitute the town's watershed. Men are employed to trap the rabbits, which are regularly sent to Birmingham, and other cities. Each rabbit yields a profit of about 6d. Last year 7,000 rabbits were sold, and the total this year is expected to reach 10,000.

—A new mayor was recently self-elected in Denver, Col. The proclamation making the announcement was nailed to a telegraph pole in a back alley, which reads as follows: "I am the mayor, and my brother Peter is my captain. All who pass into this neighborhood and do not show me allegiance will fare ill. Stratus Coklanus." The ambitious Stratus is now bewailing his fate within the city jail. The proclamation and resulting riot, which led to the arrest, were the outgrowth of quarrels between rival factions of the Greek colony in Denver.

—There yet remain in London of the old taverns seven Adam and Eves, five Noah's Arks and, naturally, connected with that, as many Olive Branches. There are two Jacob's Wells, one Job's Castle and one Samson's Castle. Oldest of all, but not the least appropriate, is a Simon the Tanner, in Long Lane, Bermondsey, the seat of the tanning industry in South London. Among those marked for destruction, too, one notes the sign of the Two Spies, a reference, of course, to those advance Israelites who returned from the Promised Land with their burden of grapes.

TO LICENSE JERSEY MOSQUITOES.

The legislators of Gotham were recently taken in by a practical joker, who presented an elaborately prepared preamble and resolution. The clerk of the Board of Aldermen read part way through the document before it was discovered that some one had played a joke on Alderman Bridges, who, it will be remembered, is a poet and the rival of "Bathhouse John," of Chicago. The preamble set forth that certain inhabitants of New Jersey had been doing business in New York without license, and then followed this resolution:

"Resolved, That on and after May 1, 1901, each and every inhabitant and denizen of New Jersey known to natural history as 'Mosquitibus Jersewanicus,' or otherwise known as the mosquito, of whatever sex, size or previous condition of servitude, shall, before being permitted to do business in any of the streets, avenues, thoroughfares, houses, vacant lots, stables, rooms, theatres, hotels or slaughter houses in the city of New York as at present constituted, first obtain a license, for which an annual fee of \$10 shall be paid to the Chief of the Bureau of Licenses of said city; and, be it further

"Resolved, That each and every one of the so-called described inhabitants and denizens of New Jersey who violate the provisions of this resolution shall, upon arrest and conviction, be fined not less than \$10, or in default thereof shall be imprisoned alone in a room with the Alderman representing the 11d Assembly District of Kings County."

MUNICIPAL HOGS.

A "MUNICIPAL HOGGERY" is the latest product of the municipal ownership fad. It has been operated successfully for several years by Worcester, Mass. The overseers of the poor collect the city garbage and feed it to swine at the city farm. Paupers are employed to accompany the drivers of the garbage carts upon their rounds and as much of the work as possible is performed by the inmates of the city poorhouse.

An average of 1,800 swine, including the suckers at the breeding pen, are maintained by the garbage collected. The breeding sows and suckers are all kept under cover in steam-heated sheds. When the small pigs are weaned they are first placed under the horse or cow barns so as to become acclimated. In a few weeks they are turned into the open fields. The city farm has 370 acres, and the pig fields are one-half mile from any highway. The farm is well located to care for swine.

The work was commenced in 1872, at which time only one team was employed. There are now sixteen teams, twelve of them two horse and four of them one horse wagons. In addition there is a fish offal team drawn by two horses. Each team makes on an average nine trips per week. A long trip three times per week and two short trips on alternate days. This wagon makes four or five trips per week. Two foremen are each paid \$35 per month and board. All drivers are each paid \$25 per month and board. The cost of collection for the fiscal year of 1900 was \$17,000. Receipts from sale of pork, \$11,300; net expense of the department, \$5,700.

THE ALDERMAN LIKED THE INTERVIEW.

INTERVIEWER—"Alderman Swelhed, I have come to get your views on the proposed change in the curriculum of the grammar school."

ALDERMAN SWELHED—"Curriculum! What's that? I'm agin it, whatever it is."

ALDERMAN SWELHED (reading the report of the interviewer next morning)—"Our distinguished townsman, Mr. M. T. Swelhed, was found at his charming home, surrounded by abundant indication of ripe scholarship and sturdy common sense. In reply to our reporter's question he said:

"I do not desire to force my opinions upon the public; but this I will say that I have given to this question long and studious attention, incidentally examining into the curricula of institutions of learning both at home and abroad, and, although I find in the existing course of study not a few matters for condemnation, still, upon the whole, I cannot say that I should advise any radical change until I have further time to examine into the subject."

"By George, that feller's got my exact language, word for word! And he didn't take no notes, neither! By George, what a memory that feller must have!"—*Tit-Bits.*

—The United States have 129 cities of 30,000 population and over.

—New York City has a total of 3,964,655 books in its municipal and other libraries.

—Not more than two years ago a large western city was paying \$12,000 for putting \$4,000 worth of coal under the boilers to heat the city buildings.



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TABLE OF CONTENTS.

	PAGE.
Brick Makers in Convention.....	71
Construction of Brick Pavements. By George R. Grimes, C. E., Terre Haute, Ind.....	73
Wood Pavement in the United States.....	75
Brick Pavement in the United States.....	75
The Eugene Field School. By Alvin D. Reed, St. Louis.....	75
The National Municipal League. Hon. Clinton Rogers Wood- ruff, Philadelphia.....	77
Municipal Street Signs. By Elmer Lee, A. M., M. D., New York	78
Current Items.....	80
Municipal Oddities.....	81
Editorial.....	82
Convention Dates.....	84
Personalities.....	84
Letters to the Editor.....	85
Public Gas Works in Italy. By Riccardo Bachi.....	88
Street Cleaning in Baltimore. By Paul Iglehart, Commissioner..	89
Baltimore Wins in Conduit Controversy.....	93
Garbage Collection and Disposal.....	94
Water Department.....	95
A Comparative Study in Parks. By M. O. Stone, Secretary Rochester Park Board.....	98
The Parks and Boulevards of Detroit. By R. J. Coryell, De- troit, Mich.....	99
Fire Department.....	102
Police Department.....	104
Health Department.....	105
Books and Periodicals.....	106
Publisher's Department.....	107
Municipal Bond Sales for February.....	110

EDITORIAL COMMENT

THE city engineers of the country are indebted to F. E. V. Bardol, C. E., of Buffalo, N. Y., for the table on asphalt statistics which we issued as a supplement last month. It is a most valuable compilation.

ACCORDING to press reports the municipal bookkeeping of Rochester is out of order. The Controller's and Treasurer's books do not agree. It seems to be a lack of a good system. This is another evidence of the need of uniformity in municipal accounting.

THE aldermen of the cities of the second class of New York State want salaries, for which they are bitterly criticised and accused of all sorts of things. We have never been able to understand why an alderman is not as worthy of his hire as the Mayor or any other paid city official. Our policy would be to pay the aldermen a good salary; then expect and exact efficient and faithful service.

THE usefulness of the fire-drill in public schools was recently demonstrated in New York, when 2,500 children marched in perfect order out of a burning school building. The drill should never be neglected. The children should be kept proficient in it at all times. It is enjoyed by them, and at the same time it is a constant and trustworthy safeguard for the preservation of life and limb.

SPECIAL attention is called to the description of the garbage destructor of Darwen, England, which is given in this issue. The illustrated article together with the correspondence elicited by an inquiry relating to this subject in the February number cannot fail to interest most city officials, for there is no more burning question connected with the modern city than the disposal of its garbage.

IT was not so many years ago when various cities of the country could boast of school buildings superior to those of New York. Conditions have changed, and now many of the school buildings in use in this city have no equal in any other city in America. The introduction of terra cotta four years ago in the construction of school buildings has been the means of working this revolution. It will be a good idea for other cities to follow New York's example.

THE city of Cambridge, Mass., is entitled to a place on the honor roll, by the fact that it transacts its business absolutely "on the square." Two contractors, who have sold several thousand dollars' worth of goods to the city within the past year, testified that they received their cash without even having to discount their bills in order to obtain their money in thirty days' time. This is a record to be proud of. Will some one name the other cities which transact business in a similar manner?

THE city of Minneapolis, Minn., with several others, feels the need of a better system for collecting garbage. Many a city has made a serious blunder right here, thinking that an ordinary wagon would answer the purpose as well as the "expensive sanitary garbage wagon." The modern sanitary garbage wagon is a little higher in price, but it pays for itself. This has been repeatedly demonstrated. Superintendent C. A. Brown, of Cambridge, Mass., has had the latest experience in this connection.

THE dangers to life and limb of the pedestrian who traverses the modern city by day and by night have been greatly multiplied during the past decade. The trolley car, automobile, bicycle and other vehicles get in their deadly work at all times of the year, but at an increased rate during the summer months. Now is the time for the wideawake mayor and legislator to see that ordinances providing safeguards for the unwary pedestrian are enacted.

IT is time it were more generally recognized by civic authorities that there is great need of the counsel and work of women in the administration of municipal affairs. The average city would be

much cleaner if there were connected with its "municipal house-cleaning" departments one or more women. Mayor Gray, of Minneapolis, speaks in the highest terms of the work of women in his city, where they have had an opportunity to exert their influence.

Now that Senator Quay is once more in power he proposes to punish those who dared to question his authority. The first score will be settled by the passage of a "ripper" bill, so called because it rips the life out of cities of the second class in Pennsylvania, which include Pittsburg, Allegheny and Scranton. If the measure becomes a law the mayors of these cities will be legislated out of office and the Governor empowered to appoint their successors for a period of two years. Once more the baneful influence of politics is felt.

IN order to promote uniformity in street signs we have opened the discussion of the subject with an article by Dr. Elmer Lee, of this city, who has given the question considerable thought for several years. Dr. Lee submits designs which are at once useful and pleasing to the eye, and which, to all intents and purposes, meet the requirements for a uniform and efficient system of street signs. If any of our readers have either ideas or designs relating to this subject we would be glad to have them sent to the MUNICIPAL JOURNAL AND ENGINEER.

END OF RAMAPO FIGHT IN SIGHT.

THE fight against the Ramapo Water Company is practically at an end. The last one of the three anti-Ramapo bills, which were introduced at the opening of the present session of the New York Legislature by the Merchants' Association, passed the Senate on February 28 by practically a unanimous vote. The Merchants' Association is to be heartily congratulated over the successful issue of its long and bitter fight to maintain the rights of New York City. Controller Coler is also deserving of much commendation for the part he has borne in the fray.

The first bill provided for the restoration to New York City of the right of condemnation, which right had been curtailed by the new charter and limited by its phraseology. This bill passed both Senate and Assembly.

The second bill provided for the separation of the water debt from the general debt of the city. The object of this was to provide an additional margin for municipal ownership. The passing of this bill by the Senate and Assembly removes the excuse of the city officials, who executed the Ramapo water contract, and makes it possible to increase the water debt as the plant has been and is a source of revenue to the city.

The extraordinary powers which were granted to the Ramapo Water Company by special legislation in 1895 were still a menace to the city, and the introduction of the third bill was, therefore, necessary. This bill provided for the unconditional repeal of these powers.

As we go to press this third bill is before the Assembly Cities Committee. From reliable information and from the fact of its unanimous passage by the Senate it is reasonable to forecast that the same bill will be favorably reported by the committee and passed by the Assembly.

These three bills relieve the situation absolutely of the Ramapo cloud and clear the way for municipal ownership. This result will enable the city authorities to take whatever course may be best for the city's interest in providing it with an adequate water supply from the best source obtainable.

THE STREET RAILWAYS AND THE PUBLIC.

EVEN the casual observer of municipal affairs in the United States to-day cannot fail to be impressed by the multiplying evidences of public hostility to the existing system of ownership and management of street railways. This antagonism does not always assume the form of a demand for the abolition of private ownership, but it is a significant fact that it generally reaches this goal after the people have pleaded and fought unavailingly for better service, then for reduced fares, then for free competition, then for public control.

Indeed the patience of the public in many cities, and its desire for fair play which makes it ready to accept the most moderate concessions with enthusiasm, have been the amazing features of this long struggle between the people and the corporations. If the owners of street railway systems had manifested an equally moderate temper they would not now be confronted by the extreme probability of the wide expropriation of their property.

For indeed the question of municipal ownership of street railways has passed out of the academic phase into the domain of practical politics. Its complete application in Detroit was narrowly defeated a year ago, and is yet a matter of possibility with the impending expiration of several of the most valuable franchises. In Columbus, Ohio, the struggle over the renewal of an expired franchise, and the public's compensation therefor, has resulted in complicated litigation between two "magnates" for the prize, and the people are asking why they should not take it themselves. In Chicago, at the last municipal election, three political parties put public ownership in their platforms, and the present mayor was elected largely because a long fight against the street railways had convinced the voters of the sincerity of his antagonism to the corporations. It is significant that his managers are trying to manoeuvre so that the elections next month shall turn on the same issue—showing that however much the owners of street railway property may misunderstand public sentiment, the practical politician gauges it correctly. In St. Louis, a few weeks ago, the street railways succeeded in dictating the Democratic nominee for mayor, with the result that an Independent Democrat has been put in the field with municipal ownership for the main plank in his platform. Neither latitude nor longitude, the size of the city nor the characteristics of its people seems to affect this growing hostility to the street railway corporations. Whether justifiable or not, the corporations must reckon with it as a factor in their balance sheets for the next decade.

For this hostility the corporations have in too many cases given every possible justification. It is not necessary to accept municipal ownership as the remedy in order to recognize that fact. Almost alone among the managers of great enterprises, they have steadfastly refused to recognize the downward trend of prices, and to let their patrons have some share in the economies resulting from a greater volume of business, improved methods and the cheapening of material. Even the monster monopolies—such as the Standard Oil Company—do cheapen their products from time to time, if not as rapidly as free competition would have cheapened them, still sufficiently to give plausibility to the plea that the public has had some share in their prosperity. But the street railways which charged five cents twenty-five years ago, charge five cents still, unless the expiration of some vital franchise has given the public a club wherewith to extort a concession which it would have been good business sense to proffer voluntarily. Indeed, in some cities, the fare has actually been increased, as in Chicago, where twenty years ago tickets were sold at reduced rates. Now, with a fivefold population, with horse power replaced by the cheap and efficient trolley, the tickets are withdrawn and the maximum fare exacted.

"But," say the street railway men, "we do give the public a share of our increased earnings. We give them better cars, faster service, longer hauls."

True enough, but each of these boons to the passenger is equally advantageous to the company. The better cars are bigger and earn more. The faster service means more trips and increased earning capacity. The longer hauls mean a vastly greater territory to draw passengers from.

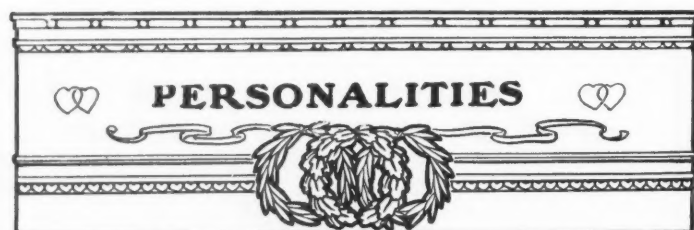
Certain recent occurrences in the world of street railway promotion and management have contributed very greatly to the education of the public. For example, in Columbus, not one of the great cities of the land, the franchise for which two prominent street railway men are fighting in the courts limits the holder to a three cent fare. Yet it is thought worth fighting for. In Detroit, the funding operations incident to a consolidation of two rival systems have brought to light the methods adopted in financing a road, and have called the people's attention to the ease with which a franchise, freely given, may be made worth millions to its lucky recipients. The story, which is vouched for by a trustworthy paper, may well be told here:

A few years ago all the streets of Detroit were in the grasp of one syndicate, which, after the manner of its kind, proceeded to use its power for all it was worth. The people, as an incident to a fight for reduced fares, granted to a new corporation, practically without remuneration, a franchise over several other streets, paralleling the old roads at many points. The new franchise provided for three cent fares, but this did not seem to seriously affect its value in the eyes of the grantees, nor for that matter in those of men of capital, for with the franchise alone for security the promoters sold bonds enough to build the road and even divide a small surplus among themselves—the stock thus costing them nothing. Then, with the usual indifference of a corporation to a merely moral obligation, this corporation which had secured its franchise on promise of competition, proceeded to effect a consolidation with the old company. By the simple methods of swapping stock in the constituent companies for that of the consolidated concern, and the customary additions of water, the fortunate holders of this stock which had cost nothing became the owners of \$4,314,000 of stock in the consolidated roads—which they are now offering at 70 cents on the dollar. All that it cost them was the franchise, for which the city received nothing, and \$80,000, which they paid for certain stock in the older company.

Thus the people of Detroit have been taught that even a three cent franchise has great commercial value; they have seen that men who know the ropes can use a public grant as a means of making millions without the expenditure of a dollar, and they are likely to remember these facts when the time comes to determine what shall be done with the franchises which in a few months are to expire.

These are but a few illuminating facts out of many which might be cited. Whatever may be thought of the possibility or expediency of municipal ownership, the time is about ripe for street railway promoters to commune with themselves and consider whether they have not already come near to killing the goose that has laid so many golden eggs.

WILLIS J. ABBOT.



- Joseph F. Hammer is the new Controller of Altoona, Pa.
- George Beck has been elected City Clerk of Goshen, Ind.
- Dr. D. C. Hawley has been elected mayor of Burlington, Vt.
- David O. Frost has been elected water commisisoner of Gloucester, Mass.
- Dr. C. B. Gilbert is the new superintendent of public schools of Rochester, N. Y.
- Mayor Bacon, of Whatcom, Wash., has closed all the gambling houses in the city.
- Mayor Carter H. Harrison, of Chicago, has been renominated on the Democratic ticket.
- Henry H. Lane was elected Mayor of Peekskill, N. Y., by the Democrats, at the recent election.
- Mayor Samuel M. Jones has announced himself as a candidate for re-election as Mayor of Toledo, O.
- Lieutenant G. W. Langdon is the new superintendent of the street department of Newburyport, Mass.
- William R. Gunderman, Republican, was the successful candidate in the recent mayoralty contest at Ithaca, N. Y.
- Rudolph Hering, C. E., of New York City, has been engaged to draft plans for the new sewer system of Columbus, O.
- Walter S. Reed has been selected to fill the vacancy made by the resignation of Mayor Benjamin P. Morris, of Long Branch.
- The Hon. T. L. Johnson has been nominated for Mayor of Cleveland on a ticket of three-cent car fares and municipal ownership of street railway franchises.
- The city of Worcester, Mass., at the last regular election had a tie in the mayoralty vote. As a result a special election was called

to settle the dispute. Philip J. O'Connell was the successful candidate.

—Alexander Hultman, Mayor of Stockholm; John Daly, Mayor of Limerick, Ireland, and J. D. Peterson, Mayor of Glasgow, Scotland, arrived in New York last month, for a short stay in the United States.

—Major J. B. Collins, president of the Common Council of Jamestown, N. Y., is a candidate for re-election from his ward. Major Collins was largely instrumental in getting the League of American Municipalities to hold its next session in Jamestown.

—Senator George F. Hoar has a high ideal of civic duty, as he recently journeyed from Washington to Worcester, Mass., in order that he might exercise his right of franchise in the special municipal election to decide a tie vote between mayoralty candidates.

—At the recent annual election of officers of the Civil Engineers' Society of St. Paul, Minn., the following officers were chosen: A. G. Powell, president; A. W. Munster, vice-president; G. S. Edmondstone, secretary; A. H. Hogeland, treasurer; C. A. Winslow, librarian.

—At the recent municipal election in Franklin, Pa., Charles J. S. Miller was re-elected on the Republican ticket with Democratic indorsement, by a large majority over a Prohibitionist candidate. He is only twenty-eight years of age, and the youngest Mayor in Pennsylvania.

—Miss Jane Adams, of Hull House, Chicago, and Mrs. Joseph T. Bowen will build a large model tenement in the Nineteenth Ward of Chicago, in the spring. The building will contain 100 rooms. It will be of stone and brick, and four stories high. Six additional stories will be added if the experiment meets with success. Rooms will be rented for from \$1 to \$3 a month, and each room is to have steam heat, a gas range, electric light and hot and cold water. A bathroom is to be provided for every three rooms. The top floor is to be given over to single men. A central court will contain a fountain, flowers, and a playground for children.

CONVENTION DATES.

MARCH.

- State Horticultural Flower Show, of Pennsylvania, takes place in Philadelphia, March 19-22. David Rust, secretary, Horticultural Hall, Philadelphia, Pa.
- The Automobile Show will be held in Chicago, Ill., on March 23-30, 1901.
- Charities and Corrections State Conference, of Iowa, will meet in Red Oaks, Ia., in March. Charlotta Goff, secretary, 607 Locust street, Des Moines, Ia.

APRIL.

- The Volunteer Firemen's Association, of Alabama, will meet in Mobile, Ala., on April 6, 1901. J. H. Turner, secretary, Mobile.
- The American Social Science Association will meet in Washington, D. C., some time during the month.

MAY.

- The Municipal League of Ohio will meet in Cleveland, O., on May 14-16. Dr. S. O. Giffin, secretary, Columbus, O.
- National Conference of Charities and Corrections will take place in Washington, D. C., in May. H. H. Hart, Unity Building, Chicago, Ill.
- National Municipal League, Hon. Clinton Rogers Woodruff, secretary, Girard Building, Philadelphia, will meet in Rochester, May 8-10, 1901.

JUNE.

- The National Social and Political Conference will take place in Detroit, Mich., June 28-July 2, 1901. D. J. Meserole, secretary, 160 Joralemon street, Brooklyn, N. Y.
- American Water Works Association, Peter Milne, C. E., secretary, will be held in New York City during the week beginning June 17, 1901.

JULY.

- The American Library Association will meet in Waukesha, Wis., on July 3, 1901.
- The Trans-Mississippi Congress will meet in Cripple Creek, Colo., on July 17-21.

AUGUST.

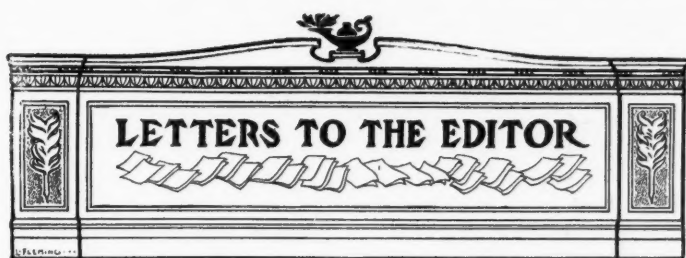
- American Florists' and Ornamental Horticulturists' Association will meet in Buffalo, N. Y., on August 20-24, 1901. William J. Stewart, secretary, 67 Broomfield street, Boston, Mass.

SEPTEMBER.

- The Glasgow Engineering Congress, Glasgow, Scotland, will be held in September, 1901.
- American Public Health Association will meet in Buffalo, N. Y., September 17-20, 1901. Dr. C. O. Probst, secretary, Columbus, O.

OCTOBER.

- Western Gas Association will meet in Louisville, Ky., in October.



"PUBLIC VS. PRIVATE OWNERSHIP."

URBANA, O., Feb. 21, 1901.

Editor MUNICIPAL JOURNAL AND ENGINEER:

My knowledge of the situation in this State convinces me that every city should own its lighting and water plants. Fully 80 per cent. of the water plants in Ohio are owned by the municipality. I reply, most emphatically, yes, to Mr. Dempsey.

_____, Alderman.

RICHMOND, Va., Feb. 25, 1901.

Editor MUNICIPAL JOURNAL AND ENGINEER:

If Mr. Dempsey, of Wisconsin, would only make a visit to this city it would not take me long to convince him of the greater benefits to be derived under public ownership as compared with private ownership; that is, benefits to the people. We obtain water and gas at a much less price than could be hoped for if the plants were owned by private companies.

_____, Alderman.

_____, Ore., Feb. 20, 1901.

Editor MUNICIPAL JOURNAL AND ENGINEER:

In reply to the question of Edw. J. Dempsey, of Wisconsin, I would say, most decidedly, yes. From my observation and experience of cities on the Pacific Slope, I am convinced that municipally conducted plants in the water and electric lighting fields, whether the city officials are above the average in honesty or not, are more profitable for the people and the city than where the same is carried on by a private plant. Many of the smaller cities have already demonstrated this fact, and now San Francisco proposes to venture into the field, as it contemplates buying out the private water company.

SAMUEL J. SWARTZ.

LYNCHBURG, Va., Feb. 27, 1901.

Editor MUNICIPAL JOURNAL AND ENGINEER:

Your correspondent, Mr. Dempsey, of Wisconsin, asks a big question in his letter of January 4. Briefly, I believe that a city with honest officials can more or less advantageously own an industry, as it fills to a greater or less degree the following requirements:

Public ownership shall be a natural monopoly of general public use, not requiring much executive ability or money in its maintenance and operation. Also, when it occupies public property, and when public safety or convenience is involved. The municipal ownership of electrical poles and conduits is a striking illustration, especially as it reduces the multitude of poles encumbering the streets and increases the safety of the public thoroughfares, as well as allowing more favorable opportunities for competition.

P. H. TROUT, JR., City Electrician.

"STEAM FROM GARBAGE DESTRUCTORS."

NEW YORK, February 23, 1901.

Editor MUNICIPAL JOURNAL AND ENGINEER:

Under the above heading I notice an inquiry you have in your last issue, from Mr. D. George Shryock, asking for the address of someone who builds garbage plants where the garbage itself furnishes the fuel and creates steam. I also noted your reply to your correspondent, saying that there are several in England, but none in this country.

Kindly give me space to say that I know the conditions of garbage cremation in both England and this country, that steam producing plants existed in this country years before our English cousins got any satisfactory results, and that the troubles that exist in the present English plants were the cause of the abandonment of such plants in this country at that time. To Robert L. Walker, a pioneer on

garbage incineration, credit must be given for his persistency in so far perfecting the garbage furnaces of twenty years ago, that to-day we have perfectly odorless and smokeless garbage plants that generate steam and utilize the power for useful purposes.

Your correspondent is from Pennsylvania. I would refer him to the "Proceedings of Engineers' Society of Western Pennsylvania," Vol. 14, June, 1898, where he will find a paper read by Mr. Walker, who states that a furnace of his, burning fifty tons of garbage per day, will supply sufficient heat to operate a 200 horse power boiler yielding upwards of 200 arc lights, etc. These same furnaces are being built to-day with a capacity of 500 tons of garbage per day, so that with ten times the amount of garbage, a proportionate increase of horse power is obtainable.

Your promise of a full description of an English plant in your next issue will be very interesting to many of your readers, as the subject of garbage disposal is of the utmost importance to not only city departments, but to the general public. Particulars at this time are acceptable, as they must lead to discussions from which no better plan can be suggested than to give your readers such valuable descriptions. There are many phases to this question for the garbage disposal engineer to answer, while the efficiency of incineration only, as against some bye-products, profits from grease obtainable, etc., is a somewhat open question. There is no question but that incineration is the most satisfactory sanitary method of disposal, and now that we have perfectly odorless and smokeless furnaces guaranteed, the financial phase is the most important. To fill these requirements we must have cheap initial cost, and either bye-products or cheap operation is to the average American city a secondary consideration, though equally essential to the success of the average bidder who proposes to erect a plant. There are weak points in the most of existing plants, but to the plant that can dispose of garbage to such capacities as from twenty-five to five hundred tons per day and generate steam to the extent I give you, and that without odor or smoke, cheap initial cost, cheaply operated, will naturally receive the attention it deserves.

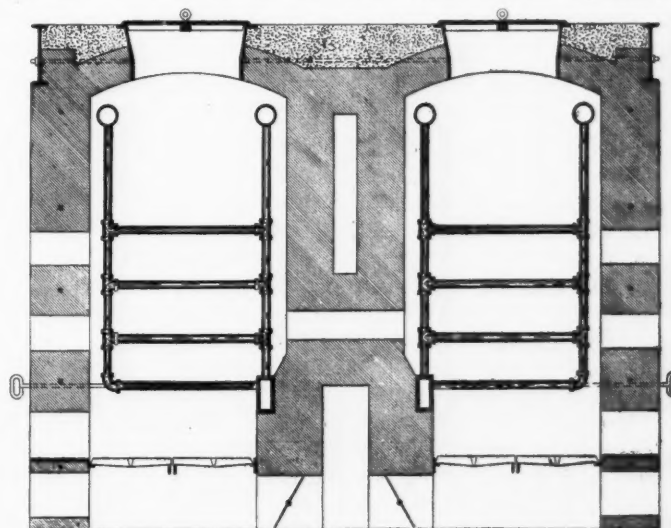
T. A. WIGHAM.

BRIDGEPORT, Conn., Feb. 27, 1901.

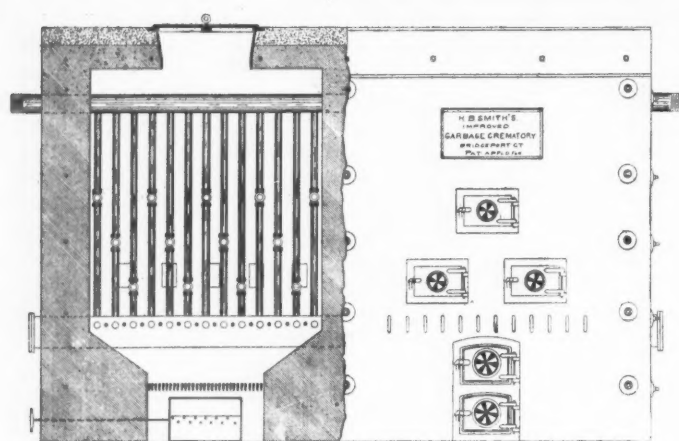
Editor MUNICIPAL JOURNAL AND ENGINEER:

I notice the query, in your February issue, of Mr. D. George Shryock, in regard to the production of steam in the cremation of garbage. I would call his attention to the work of the crematory recently installed at Waterbury, Conn., by the Bridgeport Boiler Works Company, of this city. The plant has been in operation since January 1, and has given the utmost satisfaction. The accompanying illustrations, together with the following description, will give a fair idea of what the cremator is.

Sections through center of furnaces show the cribs for holding the garbage, which is dumped or shovelled through the openings in the top of furnaces. The top is of sufficient strength to drive over with loads of garbage when collected, the entire collection being thrown in until the crib is full. The opposite side having been pre-



WATERBURY, CONN., GARBAGE CREMATORY.



WATERBURY, CONN., GARBAGE CREMATORY.

viously filled and dried, and the crib for holding the garbage being made of steam pipes, which are connected, a fire in one compartment will circulate the water through all.

The furnaces, grate bars and ash pits are made the same as in steam boilers. To burn the garbage the fire is started as in steam boilers, and when once going, the small bars shown are withdrawn, allowing the garbage to fall directly on the fire, with but little poking, when it at once commences to burn, and as it burns, additional garbage is let down and the fire kept covered. The garbage burns freely, and produces a large amount of heat, which is imparted to the water in the pipes in this compartment, and as it is a well-known law that hot water will circulate through a long series of pipes, therefore the water from the furnace where the garbage is burning will circulate around that where there is no fire. Besides, the surplus heat not taken by the water in the pipes passes around the garbage, drying it to a great extent; thence it passes to the center flue, shown between the fires; thence to the chimney, so that by the time that one chamber has been burned out, the one which the water and waste heat have passed through has dried sufficient to burn. Fire is then started under that, and the heat is then turned into the chambers which have green garbage. That which has burned out is then refilled, the operation being repeated and always turning the waste heat from one chamber to another, as occasion requires, thus utilizing the waste heat to dry the garbage that has been placed in one of the chambers.

The front elevation shows the usual fire and ash pit doors, through which the garbage can be seen, and if it becomes clogged in any form, it is loosened and drops on the fire. The round bars shown in the front section are withdrawn to leave a large hole for the garbage to fall through. The main part of the furnace being built of heavy brick walls, well anchored, and the crib on the inside not letting the garbage come in contact with front and rear walls, there is no strain on the side wall. From the water circulating through the pipes there is a large amount of steam generated, as the temperature of the water is high—say, 300° F. The steam can be utilized for other purposes, if desired.

HARRIS B. SMITH.

ESTIMATED COST OF ENGLISH DESTRUCTOR.

MANCHESTER, Eng., February 15, 1901.

Editor MUNICIPAL JOURNAL AND ENGINEER:

Yours of the 2d instant to hand, and, in reply to your queries, would say: (1) Yes; the construction of plants for the generation of steam from domestic refuse, poor fuel and garbage without nuisance is one of our specialties, but we doubt very much if you can raise steam from garbage (as we understand the term) alone, as there must be some percentage of carbon in the matter to be burned.

(2) As to probable cost, this entirely depends on the capacity of the plant, but say a plant capable of destroying eighty tons per day of twenty-four hours, including destructor cells, tubular boilers, pumps, engines and forced draught apparatus, would cost in this country about £6,000.

(3) Our heaviest plant is at Blackburn, Lancashire.

HEENAN & FROUDE.

"STEAM FROM GARBAGE DESTRUCTORS."

MONTREAL, Canada, Feb. 18, 1901.

Editor MUNICIPAL JOURNAL AND ENGINEER:

I note in your reply to a letter from Mr. Shryock that you expect to have a full description of one of the English plants now in operation in your next issue. While we have none of the "Decarie" plants from which the power is utilized, still the plant is capable of producing, and has produced from two and one-half to three horse power per ton of garbage, and we expect very shortly to hear of the utilization of the heat and power produced by the new "Decarie" steam plant in Minneapolis; Minn., which is expected to be running by the first of next month, and should it prove the success which we feel confident that it will, you will probably be able to get a full description of it from the city engineer.

HENRY W. ATWATER.

Any of the readers of the MUNICIPAL JOURNAL AND ENGINEER can secure an illustrated pamphlet giving a full description of the "Decarie" incinerator by addressing Mr. Atwater, at 455 St. Paul street, Montreal, Canada.—[EDITOR OF M. J. & E.]

MR. PERKIN'S PAPER CRITICISED.

NEW CASTLE, Pa., February 28, 1901.

Editor MUNICIPAL JOURNAL AND ENGINEER:

The ridiculously low cost given for arc lights by Mr. Thos. C. Perkins in his paper presented at the recent meeting of the League of American Municipalities, as published in your February, 1901, number, prompted the writer to make a more critical examination of the statements therein made by Mr. Perkins, with the result that the writer's faith in the conclusions of the paper is somewhat impaired.

The paper states that the total output of the plant for the month of October was 68,634 K. W. and that the expenses, including insurance, interest on bonds and 5 per cent. depreciation was \$1,168.51; that the cost per K. W. was substantially 16-100c. Dividing the expense by the output we get from the above figures a cost of 1.7c. per K. W. instead of the figures given in the paper. Also that the output on the commercial circuit was 61,124 K. W. for the month. Allowing line and transformer loss of 40 per cent. we should get an aggregate of 36,674 K. W. at the consumers' meters, which at the stated price of 10c. per K. W. should have yielded an income to the borough of \$3,667.40, instead of the amount actually received, namely, \$761.51.

It is also stated that the consumption of coal for the month was eighty-two tons, which is equivalent to a consumption of only 2.7 pounds of coal per K. W. This is a remarkable performance, when it is considered that plants with ten times the alleged output of the Wallingford plant use at least five pounds of soft coal per K. W. hour and think they are doing very well at that.

It will be further noticed that the two dynamos aggregating 225 K. W. capacity would have to be run about ten hours per day every day in the month to produce the output stated. This is a truly remarkable average to maintain when considered with other statements made in the paper, and further indicates no reserve power for ordinary repairs and breakdowns or for carrying the peak loads, which amount, in most stations, to at least double the average load.

We are further informed that electricity that cost 16-100c. per K. W. for "carrying on the whole business" is sold to the community at the "low" price of 10c. per K. W.

The indications are that the K. W. output of this plant have been, grossly exaggerated. Our experience here was that our incandescent lights did not burn on an average of more than two hours per day during the month of October; on this basis, estimating the output of the Wallingford station, at the consumers' meters, we would get for 4,000 16 c. p. lamps, 13,640 K. W., which, at 10c. per K. W., should net the city \$1,364; but the income from this source was only \$761.51, equivalent to an output of 7,615 K. W. for the month. So that the average of two hours per day would seem to be too great for Wallingford. Allowing, however, for possible lights used by the city, for which no income would be received, I will assume a mean of the estimated output above and the output indicated by the receipts, which gives us about 10,600 K. W. at the lamps, equivalent to

17,700 K. W. on the switchboard, allowing 40 per cent. for line and transformer losses. This amount, together with the output of 7,510 K. W. for the arcs, which seems to be theoretically correct, for the number of hours burned, we would have a total output of 25,210 K. W. for the station for the month, which, if correct, would give a cost of 4.6c. per K. W. instead of 1.06c., so that the pro rata cost of a series arc lamp would be \$4 per month, or \$48 per year, when burning only 1,704 hours. This would be equivalent to a cost of \$112.61 per year for an all night and every night service, which is a rather high price for a 1,200 c. p. series enclosed arc lamp. If the figures given in this paper have been misstated their author should be given an opportunity to correct them, inasmuch as his conclusions will undoubtedly be seized upon by many people ignorant of the principles involved, and urged as an argument in favor of municipal ownership of electric light plants, on the ground that a great saving would be effected by any community running its own plant.

GAYLORD THOMPSON,
General Manager.

The above criticism of Mr. Perkins' paper is made in the right spirit and, therefore, it is given publicity. Mr. Perkins will undoubtedly answer it in the same frank, good natured manner. This affords a good opportunity to say that our readers are given full liberty to criticise anything and everything which may appear in THE JOURNAL. The discussion of any topic by our readers is warmly welcomed.—[EDITOR of M. J. & E.]

NOVACULITE PAVEMENTS.

CAIRO, Ill., Feb. 9, 1901.

Editor MUNICIPAL JOURNAL AND ENGINEER:

Complying with my recent promise, I give you the following description of what we think—price considered—the best paving material in the world. We have used it in this city for the past fifteen years or more with satisfactory results.

The material is a gravel, or broken stone, found in large hills in this (Alexander) county, and called by us "Elco Gravel," taken from the name of the village near where it is found. Technically it is known as "Novaculite." It requires no mining and only blasting enough to loosen up the mass, when it can be easily shoveled onto the cars, and is ready to be placed on the streets. It is much improved, however, by screening; dividing it into coarse, medium and fine, when it is applied to the street in layers of from three to five inches, in the order named.

No material I have ever seen used can be put down with so little care and make a good street. For residence streets it makes the very best pavement, being noiseless, free from dust and lasting a lifetime. For heavy traffic it gives a splendid footing for teams; much better than asphalt, brick or even granite blocks. But, of course, it would not stand the wear in crowded city thoroughfares equally well with granite. In cities where the traffic is not excessively heavy, it has been demonstrated that it meets all requirements better than any other material.

Where our streets have been used for heavy teaming for ten years, the wear in the thickness of the material has not amounted to more than from one to two inches. An addition of from 10 to 15 per cent. of material would restore the roadway to its original thickness.

The repairing may be easily done by simply placing the new material on the top surface when a thorough wetting, either by rain or sprinkler, will blend it with the old street without any picking up of the old street. It is understood, of course, that the accumulation of filth or earth should be removed before the repairs are made.

The streets of this city have been improved with this material at an expense not exceeding 60 cents per square yard, and it will cost not to exceed 5 per cent. of that amount for their annual maintenance.

The source of the material with which our streets have been improved is owned by the M. & O. R. R. Co., but there is an abundant supply to be found elsewhere in the county.

Attention was first called to this material by Captain William M. Williams about twenty years ago. He had a few barrels brought

to the city, applying it to a portion of a conspicuous street. The results obtained from the sample were so satisfactory that later the city made more extensive use of the material. The streets thus improved have been in use for ten years or more, and they show very little signs of wear at the present time.

It is notable that after heavy rains the streets are as bright and clean as when the material was first applied. When the top surface is picked up it is found unstained, or in the same condition as when laid, thus showing that it is impervious to water.

N. B. THISTLEWOOD, Mayor.

TREATED WOOD BLOCK PAVING.

NEW YORK, Feb. 21, 1901.

Editor MUNICIPAL JOURNAL AND ENGINEER:

Wood block paving of to-day is quite different from the old style. Contrary to the opinion of a recent contributor to your journal, it has a growing popularity. The accompanying illustration is of Tremont street, Boston, showing work just completing at the time the photograph was taken. Half the street is paved with asphalt and half with the modern treated wood paving block.

Treated wood block paving is the paving which London is now using, and has been using for over thirty years on both her finest and most heavily trafficked streets, nearly 200 miles of it being in use in that city, and more being laid annually. King William street, at London Bridge, the Strand, Oxford, Queen Victoria, Holborn, Cornhill, Piccadilly, Regent, Lombard, and many other streets, are paved with treated wood blocks.



TREMONT STREET, BOSTON, WOOD PAVEMENT.

In Paris nearly four times as many square yards of it is in use as there is of asphalt, and it is to-day being substituted for asphalt on the thoroughfares of this city. The Rue de Rivoli, over which passes the heaviest traffic in the world, is paved with treated wood blocks, as is also the Avenue de l'Opera, the Boulevard de Madeleine, and many others—nearly a hundred miles of streets. The number of square meters of treated wood block in Paris in 1891 was 484,000, and in 1898 it was 1,165,000.

The following is an extract from an official letter from the Department of Public Works, Paris, France, under date of August 5, 1898: "Number of square meters of macadam, treated wood and asphalt pavements laid in Paris up to January 1, 1898: Macadam, 1,348,400 square meters; treated wood, 1,165,000; asphalt, 382,600.

"The wood pavement is the pavement de luxe of Paris, and is laid on our fine streets and boulevards, where the traffic is greatest. The wood pavement lasts on our heavily trafficked streets from ten to fifteen years.

"From a hygienic point of view it is more sanitary than asphalt or stone.

"The asphalt requires greater care and cost of cleaning than the wood. The macadam has the inconvenience of being dusty in summer and muddy in winter. The tendency is to do away with these pavements altogether. The macadam is the cheapest in the first cost, but it is the most expensive to maintain and clean."

Treated wood paving blocks are in extensive use in Liverpool, Manchester, Brussels, Frankfort, and in most of the great cities of Europe. It is not the round white cedar block, laid on plank, which was in use years ago, but the paving is made of rectangular blocks of the heart wood of Georgia long leaf yellow pine, laid on concrete foundation, and is more easily and cheaply repaired than any other.

William Haywood, C. E., of London, asserts, after an observation of fifty days, that a horse may be expected to travel 132 miles on granite pavement before meeting with an accident; 191 on asphalt, 446 on wood. It is, therefore, shown that a horse will travel two and one-half times as far on a treated wood pavement as on either granite or asphalt before meeting with an accident.

Tests made by Professors Daniel B. Luton and Severance Burrage, of Purdue University, Lafayette, Ind., at Lafayette, show that in the dust blown from streets that wood paving contains the least bacteria, brick next, and asphalt 100 per cent. greater amount than wood.

In the spring of 1896 there were 15,000 square yards of wood block paving laid in Indianapolis, Ind., and as examined last September, it was in perfect condition. Since that time, a total of 300,000 square yards has been laid in that city. It is also laid on Michigan avenue, Chicago, in front of the Auditorium Hotel, and about 700 feet on Tremont street, Boston, and about 100,000 square yards in South Bend, Ind.

As a summary of the merits of the creosote-resinate wooden block, it has all the advantages of asphalt and granite as to the wear of one and smoothness of the other; is less slippery than either; is less noisy than asphalt, and is easily repaired. It is filled with an absolutely insoluble, waterproof antiseptic compound, consisting of a mixture of creosote and formaldehyde, making it proof against decay, combined with resin, which is absolutely waterproof and insoluble, retaining the antiseptic in the wood and preventing the absorption of moisture, and which increases the crushing resistance and gives it an elastic surface.

ANDRIES BEVIER.

PUBLIC GAS WORKS IN ITALY.

BY RICCARDO BACHI.

DURING recent years the municipalization of public services has gained considerable popularity in Italian cities. The old-time notion that the city was the worst possible administrator and as such should confine itself to a minimum of functions, is now giving place to a new tendency which seeks to entrust to the municipality more extended social functions and wider activities in economic life. Thus, under the pressure of public opinion, numerous cities have recently assumed the management of the gas supply. Padua, Como, Spezia, Vicenza, Voghera, Asti, Vercelli, Udine, and Reggio-Calabria have established municipal service, while other cities hold this matter under advisement notwithstanding the hostile attitude of national legislation. All of these cities are of medium size and importance. The larger cities, such as Naples, Rome, Milan, Turin, and Venice, which by taking over these services would open a plentiful source of income, are bound by long-term franchises with private corporations.

In Padua, a city with over 90,000 inhabitants, near Venice, the financial results have been excellent. Between August 1, 1896, and September 30, 1897, the price of gas was the same as charged by the company. The estimated profits for this period of fourteen months were 270,000 lire

(\$54,000). The profits actually realized amounted to 290,000 lire (\$58,000). The net yearly profits of the service are now, with reduced prices, about 70,000 lire (\$14,000), and are used for the rapid amortization of the bonds, so that within ten years the municipality will own, free from all debt, a revenue-producing plant and have a relatively large income, which under private management would have gone to private speculators. To this net profit, one may properly add 45,000 lire (\$9,000), a saving to the city in the cost of public lighting. This expenditure, \$18,000 prior to municipalization, is now less than \$9,000 per year. The laborers of the department have also benefited by municipalization. A special fund (*Cassa di Previdenza*) has been instituted for their benefit. This fund is formed from contributions by the laborers—a 3 per cent. deduction from their salaries—and a contribution on the part of the city of 7 per cent. of the salaries paid. From this fund the employees receive aid in case of sickness and accident.

Como is a rich industrial city of Northern Lombardy, having about 37,000 inhabitants. Its gas works were constructed about the middle of the century by the *Societa Italiana per il gas*. When the franchise was about to expire (in 1894), a struggle between the municipality and the company took place, which threatened to leave the city without light for some time at least, as the municipal administration would not relinquish its rights and did not wish to extend the franchises. To secure control of the works, the city was called upon to pay 400,000 lire (\$80,000). The local banks were willing to advance the capital, but at an excessive rate of interest. At this juncture a wealthy citizen drew a check for the amount, which he loaned to the city at the relatively low rate of 4¼ per cent. Thus the municipality of Como came to own its gas works on November 1, 1894.

With the exception of Spezia, all the Italian municipal plants are of recent origin, so that it is not yet possible to give a positive opinion as to their permanent success and their fiscal and social consequences. However, the results obtained in these first years of municipal operation permit the hope that in Italy as well as elsewhere the municipality may gradually acquire new functions and find for itself new fields of activity. The larger plants—those of Como and Padua—have shown great development under municipal management and operation. These municipalities have boldly adopted new technical methods, proving the utter fallacy of the old prejudice, *viz.*, that public management was averse to all progress. It would, however, be but fair to say that the principal factor which urges the Italian municipalities along this new road is the need of larger incomes. Most of the cities are in a deplorable financial condition. Moreover, the Italian system of local taxation is based mainly on an indirect tax, unfair and burdensome to the poorer classes, the taxes on consumption (*octroi*). Municipalization seems to offer a solution by opening up a new source of revenue, which would also enable the municipal authorities to lighten somewhat the heavy tax burden which now rests so heavily on the working classes.—*Municipal Affairs.*

—Every city has its particular method of rewarding the "faithful."

STREET CLEANING IN BALTIMORE.

BY PAUL IGLEHART, COMMISSIONER.

THE total appropriation for the street cleaning department of Baltimore was \$384,489.00 for the year 1900, of which there was expended the sum of \$382,755.41, leaving an unexpended balance of \$1,733.59.

Several reforms worthy of notice have been introduced during the year, among which are the uniforming of the force, the advantage of which is obvious; the constant presence of the superintendents in their respective districts during working hours, with strict orders to give their undivided attention to the work.

Another reform, which will very shortly be put in operation, is the placing on the streets of a set of boxes to be receptacles for waste paper, fruit parings and miscellaneous waste. Perhaps the greatest reform contemplated is the new and sanitary method for the collection and disposal of garbage and ashes, which will be installed June 1.

Compared with other cities the cost of our department is exceedingly low. For instance, the per capita cost for the same work in Philadelphia is \$.96; New York, \$1.36; Boston, \$1.76, and in this city, \$.73. These figures will seem the more remarkable when the wretched paving conditions which obtain in our city are considered. A great number of our alleys are in such a deplorable state as to render them utterly impassable for a horse and cart. This condition not only increases the work of the garbage and ashes collectors, but is a serious menace to the health of citizens, inasmuch as these holes are full of festering matter and foul water, which, during the heated term, constantly emit nauseous odors and deadly germs. Some of our streets are nearly as bad as these alleys.

An improvement which is much needed is the ownership by the city of a complete outfit in horses, wagons, tools, etc., for conducting the entire work of the department. If we owned our outfit it would insure much better work. I have estimated that it would cost \$35,000 to purchase the complete outfit, build and equip the necessary stables, blacksmith and

repair shops. For \$70,000 per annum we could maintain and operate this branch of the service, which, with the interest on the outlay for equipment, would save more than \$12,000 on the present cost.

The work of the department is greatly augmented by the gross carelessness of a great many merchants and their employees, who sweep paper, store refuse and other waste into the streets, in direct violation of the law. I have recently taken steps to put a stop to this nuisance, and my efforts are ably seconded by the Board of Public Safety and by the police force.

When I assumed charge of the department I let it be thoroughly understood that there would be no change in the personnel, except for adequate cause. The members of the force were thoroughly impressed with the idea that the affairs of the department would be conducted upon business principles, and that a full day's work would be demanded for a full day's pay. I have endeavored to make promotions in filling vacancies from the rank below, thereby creating the feeling that merit would be rewarded whenever it was possible.

The accompanying table shows the work done and all expenditures in the street cleaning department for each month of the year ending December 31, 1900, and the amount of receipts from the sales of refuse, etc.

CARNEGIE LIBRARIES.

It is a poor town nowadays that cannot boast of having received the gift of a new library building from Andrew Carnegie. The donations of Mr. Carnegie which have been reported during the past month are as follows:

Springfield, Ill.....	\$60,000	Cumberland, Md.....	\$25,000
Jacksonville, Ill.....	40,000	Mount Vernon, N. Y....	35,000
Schenectady, N. Y.....	50,000	Port Jervis, N. Y.....	20,000
Sault Ste. Marie, Mich..	25,000	Decatur, Ill.....	60,000
Easton, Pa.....	50,000	Galesburg, Ill.....	50,000
Knox College.....	50,000	Richmond, Va.....	100,000
Tacoma, Wash.....	50,000		
		Total	\$615,000

REPORT OF WORK DONE, INCLUDING ALL EXPENDITURES IN THE STREET CLEANING DEPARTMENT FOR EACH MONTH OF THE YEAR ENDING DECEMBER 31, 1900, ALSO AMOUNT OF RECEIPTS FROM THE SALES OF REFUSE, ETC.

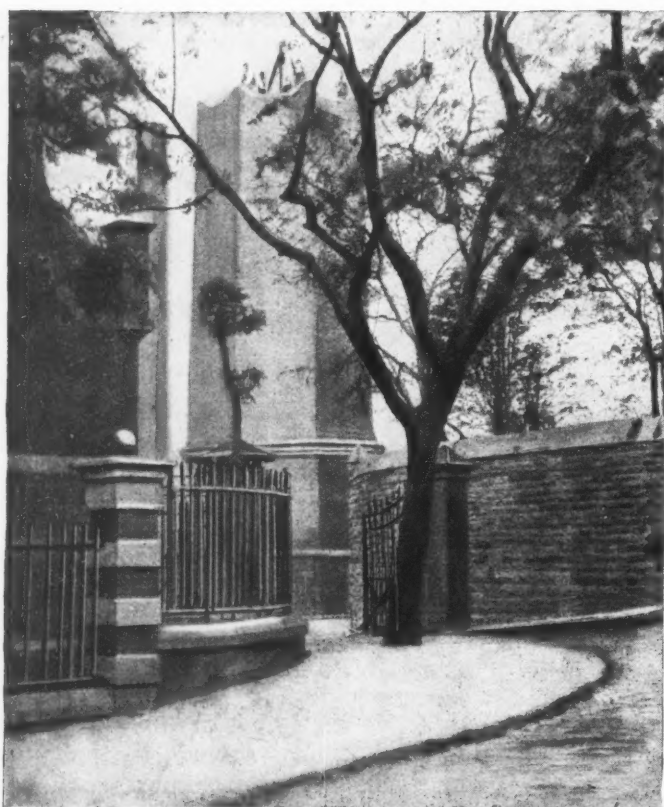
1900. MONTH.	Total No. of loads of garbage removed.	Total No. of loads of ashes removed.	Total No. of loads of street dirt, sand, snow, ice, etc., re- moved.	Cost of collecting and removing ashes and garbage.	Cost of collecting and removing street dirt, sand, snow, ice, etc.	Contingent fund.	Cost of sweeping ma- chines, sprinklers, repairs, etc.	Salaries.	Cost of tools, repairs, etc.	Total No. of loads of all kinds removed.	Total amount of expenditures.	Total amount of monies received and paid to comptroller.
January	2,131	23,260	14,762	\$15,945.00	\$15,780.44	\$83.44	\$3,882.87	\$1,284.49	\$257.99	40,153	\$37,234.23	\$57.00
February	2,057	23,144	15,174	12,405.00	12,828.36	41.10	1,889.38	1,128.74	366.03	40,375	29,883.61	.....
March	2,803	27,822	22,950	15,702.00	15,424.20	32.86	1,088.39	1,116.92	19.60	53,575	33,383.97	342.00
April	3,123	19,970	11,316	12,564.00	11,906.81	44.06	1,622.16	1,205.85	173.25	34,409	27,823.88	.....
May	5,067	16,176	12,191	12,597.00	12,890.36	64.06	2,406.41	1,170.39	213.70	33,434	30,566.92	159.35
June	8,231	16,113	16,585	15,657.00	15,970.83	10.04	1,473.35	1,286.39	158.82	40,929	34,556.43	62.00
July	7,789	10,195	12,994	12,549.00	12,953.83	46.31	1,559.47	1,274.97	39.35	30,978	28,422.93	50.00
August	9,299	6,882	13,694	12,612.28	12,772.32	120.60	2,053.32	1,275.06	508.66	29,875	29,692.24	128.90
September	11,239	7,712	17,199	15,640.50	16,258.79	2.60	1,519.78	1,274.97	15.05	36,150	38,461.69	125.00
October	6,425	9,312	13,610	12,528.00	13,267.33	.....	2,306.62	1,246.64	243.28	29,347	29,591.87	225.82
November	4,306	14,037	12,229	12,597.33	13,162.28	5.81	1,508.44	1,390.06	175.15	30,572	32,589.07	127.50
December	3,855	24,020	13,404	12,964.00	14,129.83	46.30	1,743.62	1,339.97	324.85	41,279	30,584.57	255.50
	66,325	198,643	176,108	\$163,761.11	\$167,345.38	\$497.18	\$23,053.81	\$14,994.45	\$2,405.73	441,076	\$382,755.41	\$1,533.07

STEAM POWER FROM CITY WASTE.

BY W. F. MORSE, SANITARY ENGINEER, NEW YORK.

THERE have been many attempts to solve the municipal waste disposal problem in a way which would be at once sanitary, economical and efficient. A large amount of money has been expended in useless experiments, but in twenty-five years of work in this direction substantial progress has been made, and at the present time there seems to be a means of employing city waste in such a manner as to produce results that are useful, and at the same time destroy the worthless material which is the cause of trouble for city authorities.

The English practice of disposal of city refuse by fire began thirty years ago by the adoption of a crude form of destructor which destroyed the refuse by a slow process of combustion in a closed furnace by natural draught, without any substantial attempt to increase the temperature or destroy



ENTRANCE TO DARWEN REFUSE DESTRUCTOR WORKS.

the odors or smoke resulting from the fires. It was found efficient only in a limited way, but the idea spread until many cities were experimenting and there developed a form of furnace known at first as "Fryer's Destructor," from the name of the gentleman who was the chief agent in promoting its construction. The type of furnace was primarily a small cell, or pair of cells, with a stationary grate, which is fed by depositing the refuse at the back side of the furnace on a sloping platform, bringing it gradually down to the fire as the moisture was dried out. In this way it furnished its own fuel, but the process was slow and the quantity destroyed small.

Presently a steam boiler was added at the back of the furnace in the chimney flue, and with the aid of the power developed, a forced draught was introduced in the ash pit

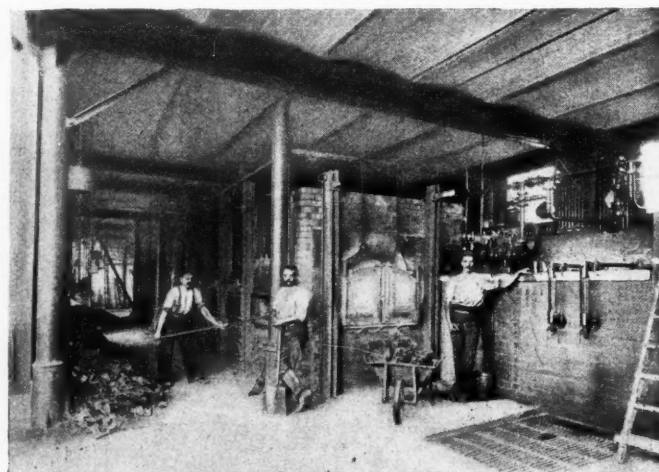


DARWEN REFUSE DESTRUCTOR—ENTRANCE TO TIPPING PLATFORM.

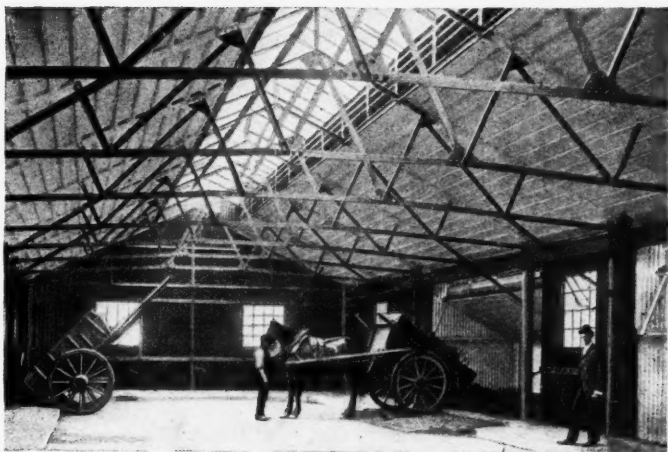
under the fire grate, which accelerated the combustion. There was still an escape of odors and fumes and a "Fume Crematory," so-called, was added by another constructor.

The next step in progress was the removal of the boiler from the long flue nearest the stack or chimney to a point immediately behind the furnace itself, where all of the heat was concentrated and used for the production of steam. The type of boiler at first used was the "Lancashire," having two or three very large flues, allowing the gases to pass quickly. It was found that a great deal of heat was being wasted, and a water tube boiler of a modern American type—"Babcock Wilcox"—was substituted, and the power developed was greatly increased. From this point various types of destructors were developed, varying only in slight particulars from each other, but all operated by the aid of a forced draught, either of steam or water, and producing a surplus of power over that required for the operation of the furnace. This power was employed in grinding up clinker or residuum from the furnace, which was made into mortar and paving blocks and tiles, in driving engines for pumping sewage or water, and for various other municipal purposes.

Then large batteries of cells were brought together, and the steam power developed by the boilers became a very important factor and was used for the assistance of the main steam supply in electricity works at a time when it was most needed for the lighting of the town. The first experiments in this direction were somewhat crude, but it was presently



DARWEN REFUSE DESTRUCTOR.



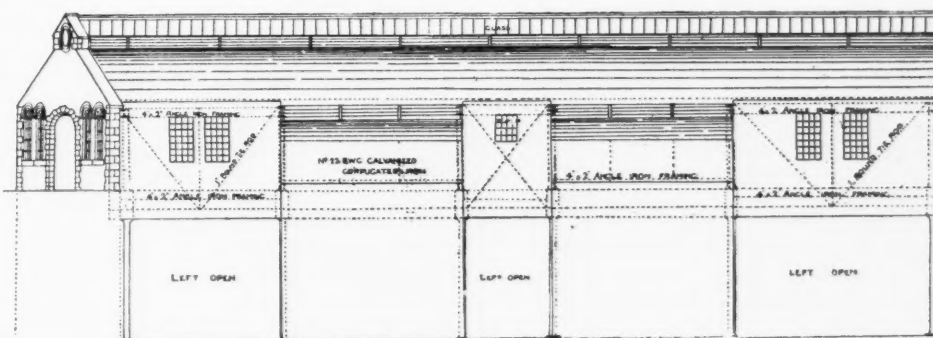
DARWEN REFUSE DESTROYER—TIPPING PLATFORM.

seen that the power resulting from the combustion of the city waste would be an important factor in reducing the expense for city lighting, and the electrical engineers devoted their attention to the utilization of this new force, with the result that some of the most eminent and experienced men in Great Britain made exhaustive reports certifying to the fact that the power to be derived from the destruction of city waste could be successfully employed in various forms of work, and at the same time that the destructor itself was not in any way rendered inefficient for the performance of its own particular purpose of destroying waste.

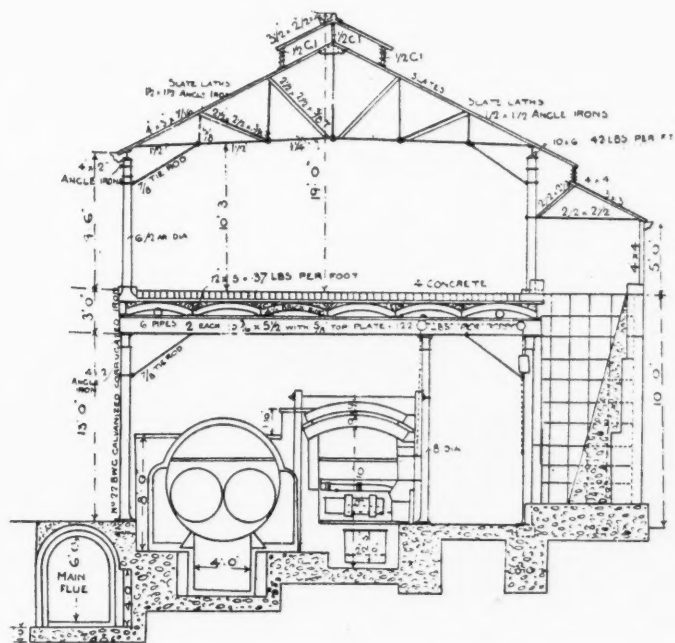
The progress which has been made in twenty-five or thirty years is at a stage where this method of garbage disposal is a recognized necessity in municipal economy of all cities and towns which are about to install destructors. At the present day there are in Great Britain upwards of 115 towns and cities employing destructors for the disposal of the

town's refuse, a considerable number being of the old type where power is not utilized, but where the disposal is the main purpose. Some seventy-five or eighty cities utilize the power for various municipal purposes and find it entirely expedient to do this without interfering with the disposal of the refuse or garbage.

A practical demonstration of the efficiency of a destructor which converts city waste into steam power without any fuel except the refuse itself, is afforded by the description of the new Electricity Works and Refuse Destructor at Darwen, England. This is a manufacturing town of 40,000 population, having an area of about 6,000 acres. The question of the disposal of the town's refuse being under consideration, the Common Council sent a deputation to several places where the heat derived from refuse destructors was utilized for power purposes, particularly for the generation of electricity. The result of the investigation proved conclusively that it was not only practicable, but also economical. They contracted with Meldrum Brothers, Manchester, England, for two "Simplex Destructors," which would furnish power



DARWEN REFUSE DESTROYER—PLAN OF HOUSE.



DARWEN REFUSE DESTROYER—CROSS-SECTION OF HOUSE.

for two large boilers to be used in generating electricity for the public lighting of the city. Each furnace has a grate area of 104 square feet and is fed or clinkered from doors in front; and each operates a boiler thirty feet long by eight feet in diameter, furnishing a steam power at a pressure of 180 to 200 pounds for operating the dynamos. A chimney of 240 feet was to be erected at the works, but it has been found by practical use that one eighty feet high would be ample for all purposes. The operation of the destructor is as follows: After passing from the furnace grate, the gases and fumes enter the combustion chamber, which is placed at right angles with the furnace, so as to baffle the draught and cause the gases to commingle, and also to deposit the lighter particles of dust here instead of allowing them to be carried into the chimney. The temperature of this chamber ranges from 1,800 to 2,000 degrees. After passing the boilers, which are situated immediately behind the combustion chamber, the gases pass through the "regenerator," which is a large number of three-inch iron pipes fixed in a vertical position so that the hot gases after leaving the boilers proceed downward through these pipes on their way to the chimneys. The air surrounding the pipes is drawn down by a powerful suction fan and forced under the ash pit of the furnace, and in this way is heated to a temperature of nearly 300 degrees, which assists the operation of firing to a very marked degree. Each of the boilers is practically 250 horse power and is

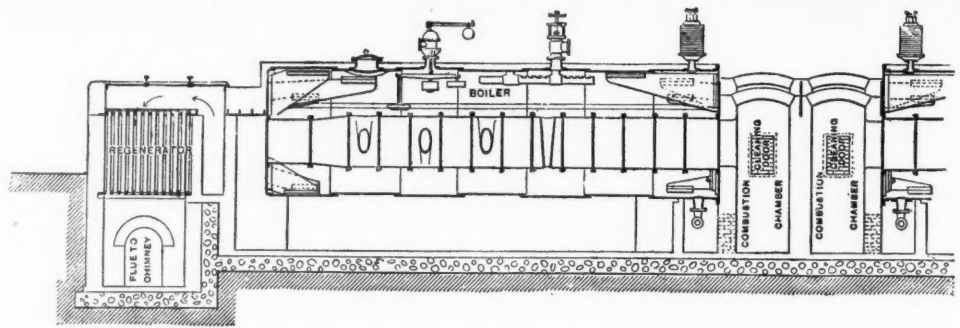
maintained at a pressure of 150 to 180 pounds constantly during the time that the refuse is being fed into the furnace. The Meldrum furnace is so arranged that only one of the grates is fired at a time, alternating grates being chosen to be filled with green garbage, leaving the ones between in a high state of combustion, and in this way the temperatures are maintained and the gases from green material are thoroughly destroyed without loss of temperature in the combustion chambers or the lowering of the power in the boilers. The report from Darwen shows practically the following results:

OFFICIAL TEST OF THE DESTRUCTOR, SEPTEMBER 23, 1899.

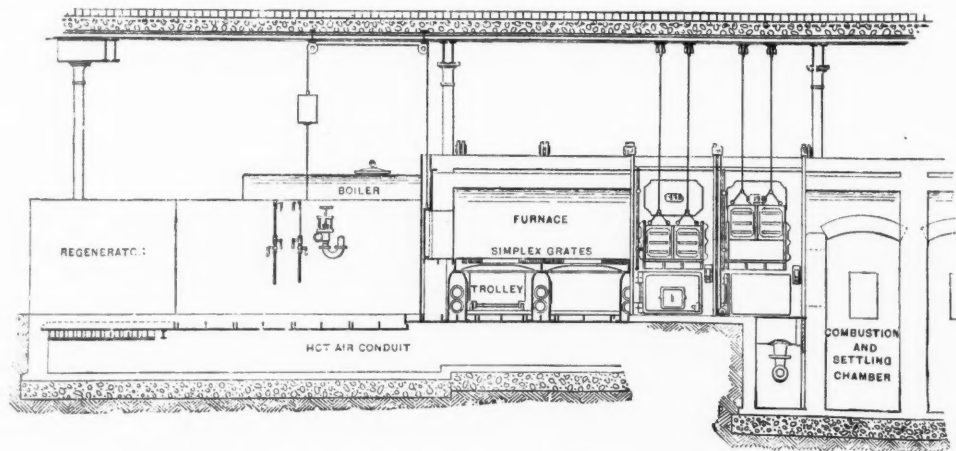
Duration of test.....	48 hours
Ash pit refuse from houses	61.88 tons
Slaughter house and fish market refuse	2 tons
Total quantity of refuse...	63.88 tons
Average per cent. of moisture	.35
Water evaporated per pound of refuse.....	1.48
Water evaporated at 212 degrees	1.55
Average steam pressure per square inch.....	183 pounds
Average temperature of combustion chamber.....	1,633 degrees
Highest temperature.....	2,000 degrees
Temperature of flue gases after leaving boiler.....	703 degrees
Temperature of flue gases after leaving generator.....	585 degrees

In this trial only one unit, consisting of one grate or four cells, 19 feet long and 5 feet 6 inches wide from back to front, containing 104 square feet, with one "Lancashire" boiler, 30 feet long, 8 feet in diameter, was in use. The quantity of refuse per day would average about thirty-two tons, but fifty-two tons have been consumed in the same time at the rate of fifty-five pounds per square foot of grate surface per hour. The whole of the public and private lighting is obtained from refuse alone, no other fuel being used.

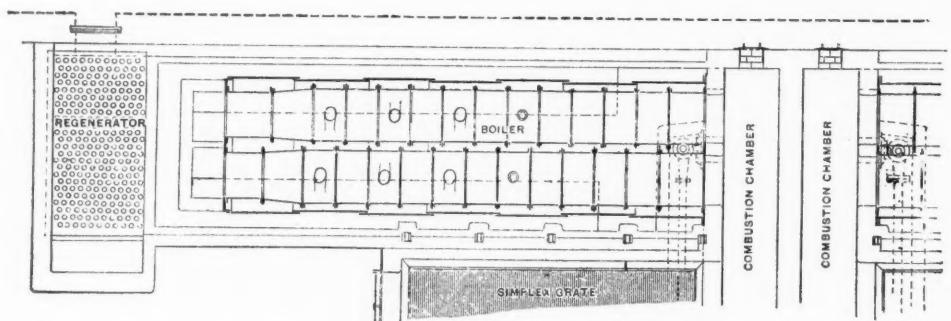
The example of Darwen is followed in numerous cities in England. Space does not allow even a mention of the many that are now employing destructors for producing power for municipal purposes. It may be interesting, perhaps, to name one town, Hunstanton, 1,500 population, having three and one-half tons of refuse per day burning at the rate of one-half ton per hour, and provides sufficient steam to pump the town's water supply each day.



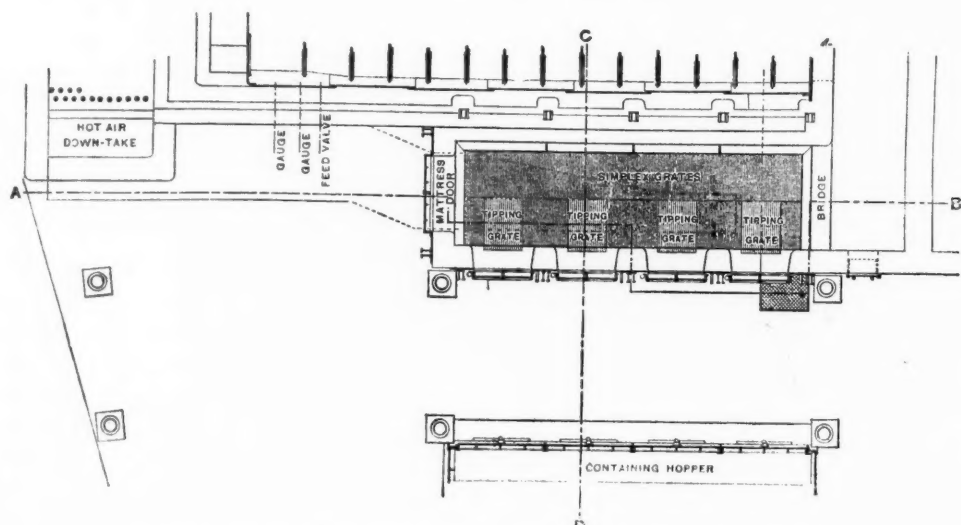
DARWEN REFUSE DESTRUCTOR—SECTION THROUGH REGENERATOR AND COMBUSTION CHAMBERS.



DARWEN REFUSE DESTRUCTOR—REGENERATOR BOILER AND COMBUSTION CHAMBER.



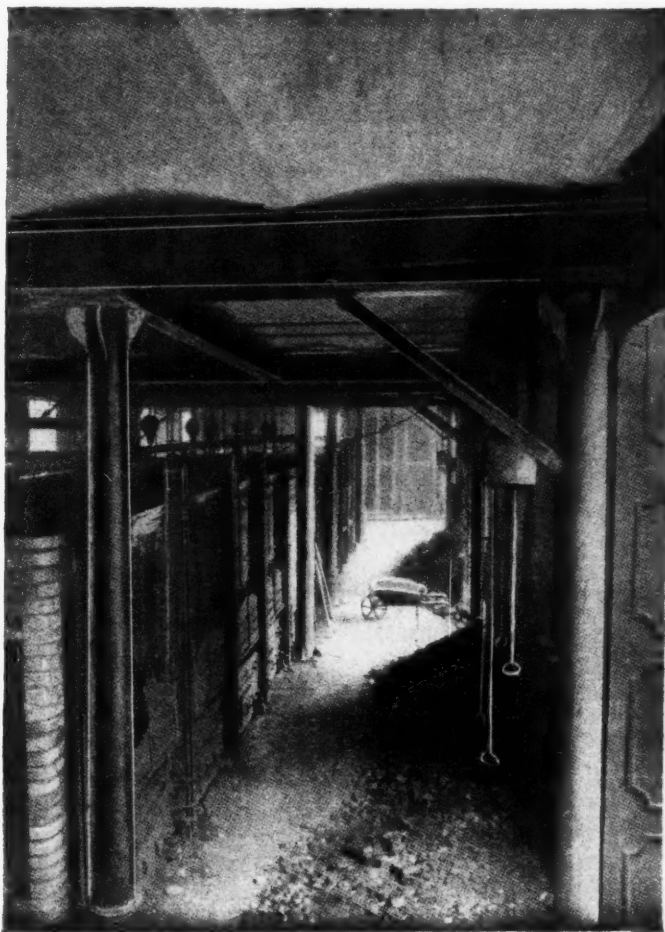
DARWEN REFUSE DESTRUCTOR—PART ELEVATION AND SECTION, SHOWING FEEDING AND CLINKERING DOORS.



DARWEN REFUSE DESTRUCTOR—CELLS, HOPPERS AND HOT AIR CONDUIT.

The city of London has about forty-one vestries, or, as we would call them, wards, eighteen of which have had or now have in use refuse destructors of some five or six different styles or types. They are now reported to be building one plant costing nearly \$1,000,000, which is intended to take the refuse from a very large section and employ it in producing electric light.

None of the large cities in Great Britain is to-day using any other method than the disposal of waste by fire and the employment of power produced therefrom for municipal purposes. It is a question which has been practically solved by the introduction of this apparatus, and the results are all that are claimed for it, being entirely sanitary, perfectly efficient and economical in every sense. There will be



DARWIN REFUSE DESTRUCTOR—CELLS AND HOPPERS.

presently published a work called "The Economic Disposal of Towns' Refuse," written by a distinguished English engineer, of which the American edition will be published by John Wiley & Son, New York, giving a concise and clear description of all destructors now in use in England with a special adaptation for the purpose of producing power; also including an account of the American cremating furnaces brought down to date. This work will be for the first time an attempt to place at the service of our communities the information that is so much needed concerning the art of garbage disposal.

THE local fire underwriters of Youngstown, O., have found conditions so menacing to insurance interests that the rates will soon be increased by 25 per cent.

BALTIMORE WINS IN CONDUIT CONTROVERSY.

FOR two years past there has been a controversy between the city of Baltimore and the Chesapeake & Potomac Telephone Company as to the use of the city's streets by the latter for the purpose of constructing underground conduits.

The city is engaged upon the construction of an underground conduit system for the reception of all wires at present overhead on its streets. At the time of beginning this work, the Telephone Company also began the construction of conduits under an ordinance granted by the city in 1889, and under which work had been done in 1889 and 1890.

The act of Legislature providing for the city's system, and requiring all wires of any character, except trolley wires, to be placed in the city conduits under certain conditions, was passed in 1892, and in this act appeared a proviso that nothing in the act should be construed to change or modify the rights granted the Telephone Company by the ordinance of 1889.

The work which the Telephone Company began concurrently with that of the city in 1898 bids fair to greatly obstruct the city work and to reduce the ultimate effectiveness of the city's system when completed. The city noted its objection to the work of that company by revoking its permit and repealing the ordinance under which it derived its powers.

The matter was twice in litigation before the Maryland Court of Appeals—the supreme court of the State—upon the question of the validity of the repealing ordinance.

The court both times decided that the ordinance under which the company was operating had been ratified by the State Legislature by the proviso in the act of 1892, and therefore had become a contract which the city was powerless to revoke.

At the last session of the Legislature, in 1900, the city made a determined effort to obtain the repeal of that portion of the act of 1892 which operated to put the ordinance of 1889 beyond the control of the city. The repeal bill passed the House but failed of the Senate, accompanied by the usual scandal of a "lobby investigation," with no result.

Having thus far failed in all efforts to prevent what was considered a serious obstacle to the success of the city's conduit system, a permit for the extension of the telephone conduits was again refused upon the ground that few, if any, poles had been removed by the company, despite the fact that the ordinance of 1889 requires "that all poles shall be removed from the streets in which conduits are built, except such as are *necessary* for purposes of distribution."

Whereupon the Telephone Company again petitioned the court to enjoin the city from interfering with them in prosecuting their work of construction, whether they were issued a permit for the work or not.

Upon the part of the city it was claimed that in the "congested sections" of the city no poles whatever were *necessary*, as all connections could be and properly should be made underground, and as at that time the city system itself provided underground connections into buildings within such districts.

The Telephone Company, on the other hand, contended that certain poles were necessary, and that even if they were not allowed for distribution into houses along streets where

they had conduits, they were necessary to connect with poles situated upon streets where there were no conduits.

Considerable expert testimony was taken and the city lost the case in the lower court. Upon appeal, however, the decree of the lower court was reversed, the main conclusions of the court being:

"That there is a new system of distribution not calling for the use of poles, feasible as to cost and mechanical construction where many telephones are in use."

"That in the 'congested parts' of Baltimore City the new system is practicable and reasonable, and all poles therein along the streets containing the conduits should be removed before the court will interfere to secure the right to the company to make further extension of their privileges under the ordinance."

Although this applies to poles situated only on streets where the company has conduits, it is, however, coming as it does after two defeats, a source of satisfaction to all citizens of Baltimore, who see in it a hope to speed the work of riding the streets of the city of its overhead wire nuisance.

The city underground conduit system is now nearly completed, at a cost of \$1,000,000, and the various companies owning overhead wires upon the streets have been notified to place their wires in cables in the city conduits within given periods of time varying according to the time required to complete the work.

There are no privately owned conduits in Baltimore other than those of the Telephone Company referred to above. Some of the new city conduits are already occupied by the cables of companies operating in the city.

GARBAGE COLLECTION AND DISPOSAL.

THE work of collecting and disposing of the garbage in Lowell, Mass., during the past seven years has been carried on at a constantly decreasing expense. From an expenditure of \$14,693.43 for this purpose in 1893, successive reductions of expenditure yearly have been made to \$8,177.95 in 1900. This annually decreasing outlay has been brought about despite our constantly increasing population and enlargement of area, by the gradual return to the system of permitting the use of garbage as food for swine upon farms adjacent to the city. So long as an appropriation is refused for the erection of a cremator, we will be able to keep the expense of collection, supervision and disposal at such figures as not to exceed, by any large amount, the outlay of the year 1900. The estimated outlay for the erection of furnace, the cost of running and the loss of income from swill would probably amount to \$20,000 a year.

It has required the most careful supervision and rigid economy for this department to struggle through the year 1900 with an appropriation of \$15,000; less than was expended during the year 1895. Our wagons for the collection of swill are made of wood and have been in use so long that no amount of care, washing and disinfection will prevent the leaving behind them in their journeys through the city, the foul odor that is soaked through them by constant use. The twenty-five horses that we work every day, through rain and shine, are caparisoned in harnesses that reflect but little credit, and the majority of the horses are kept in sheds that

are a shame and disgrace to the city of Lowell. In consideration of the above mentioned necessities of the department, the Board has repressed and controlled the wish to own a cremating plant that will cost thousands of dollars, when we have now one that, with the expenditure of a few hundreds, will place Lowell at the head of Massachusetts cities in the collection and disposal of garbage.

As this question must be considered, both from a sanitary and financial aspect, and as there is a disposal which is sanitary and still precludes adoption from the expense, it is reasonable to believe that time will aid toward the proper solution, and with our present plant repaired, Lowell can afford to await a more thorough investigation before indulging in expensive luxuries.

There are two sides to this question and ample room for honest difference of opinion, and this department has subject to the call of any committee a full assortment of cremation literature, and in order that comparison may be made as to the methods employed and the cost of collection and disposal of swill and garbage in such cities of Massachusetts as approximate the size and population of Lowell, the following statistical information based upon the reports of the year 1899, may be of value to the student and citizen:

BOSTON.

Population, 560,892.	
Cost of Health Department proper.....	\$145,020.76
Maintenance Sanitary Division.....	606,272.65
Income	30,164.84
Number of loads of house offal removed, 59,956.	
Disposition of swill: Cremated.	
\$1.08 per capita.	

WORCESTER.

Population, 118,421	
Health Department proper (Hospital for contagious diseases)	\$22,955.50
Collection of swill.....	17,109.00
Swill taken to city almshouse and fed to swine. City keeps from 400 to 1,800 hogs. Received for pork, \$10,461.52. In charge of Pauper Department. Employ 22 men, 30 horses, 18 wagons. Household-ers have to take care of their ashes.	
34 cents per capita.	

FALL RIVER.

Population, 104,863.	
Health Department proper 1899 (35 cases small-pox).....	\$30,000.00
Collection of ashes (Street Department).....	21,000.00
Collection of swill (contract five years).....	13,000.00
	\$64,000

62 cents per capita.

CAMBRIDGE.

Population, 91,886.	
Cost of Health Department (office).....	\$19,754.04
Cost of Pauper Department (collection of swill).....	25,958.65
Cost of Street Department (collection of ashes).....	22,000.00
	\$67,712.69

2,384 loads swill. Income from swill, \$6,997.40.
Cost per capita, 73 cents.

LOWELL.

Population, 90,114.	
Cost of Health Department proper.....	\$9,970.57
Cost of collection of ashes.....	17,405.58
Cost of collection of swill.....	11,017.70
Cost of small-pox.....	1,038.52
Cost of cremation.....	1,397.86
4,035 loads swill. Income from swill, \$3,796.05.	
45 cents per capita.	

NEW BEDFORD.

Population, 62,442.
 Cost of Health Department proper.....\$20,513.25
 Cost of collection of ashes (Street Department)..... 10,128.02
 Cost of collection of swill (contract)..... 15,000.00
 Swill fed to swine.
 73 cents per capita.

LYNN.

Population, 68,513.
 Cost of Health Department proper.....\$16,409.93
 Cost of collection of ashes..... 12,476.85
 Cost of collection of swill..... 12,701.38

Total cost Health Department.....\$41,588.16
 Income from swill and ashes, \$2,734.91.
 Swill fed to swine.
 66 cents per capita.

SOMERVILLE.

Population, 61,643.
 Cost of Health Department proper..... \$3,434.25
 Cost of collection of ashes..... 10,475.04
 Cost of collection of swill..... 15,090.22
 \$28,999.51

26,093 loads ashes.
 5,637 loads swill.
 \$1,000 income from swill sold.
 45 cents per capita.

SEPARATE RECEPTACLES FOR CITY USE.

THE City Councils of Chicago recently passed an ordinance which will promote cleanliness and greatly improve the appearance of the streets if its provisions are strictly enforced.

The ordinance prohibits any person, firm or corporation from casting, throwing, dropping, placing, sweeping, sifting or depositing in any manner whatever any refuse in any street, alley, walk, or in the river. If any refuse is carried by the action of the sun, wind, rain or snow upon any sidewalk or street or into the river, the guilty person is to be fined.

The owners of private houses are required to maintain separate receptacles for garbage and ashes. It makes it the duty of every head of a family in a dwelling or flat building to place the garbage and refuse receptacles on the edge of the sidewalk or in the alley.

The word "garbage" is defined as "any and all rejected or waste household food, offal, swill or carrion." The word "ashes" is defined as ashes and other residue of the combustion of any substance.

No person can sort, pack or unpack fruit, flowers, vegetables, rags, paper, old iron, bottles or junk in any street, alley, sidewalk, or other public place. No stand can be erected on a street without a permit from the commissioner of public works. No advertising is to be permitted on street lamp-posts, curbstones, trees, telegraph and telephone poles without the consent of the owners. Persons keeping horses or cattle must keep manure boxes, to be constructed under the direction of the commissioner of public works.

Owners of steam-heated flat buildings must take care of the refuse and ashes outside of the personal care of the flat dwellers.

Each renter of a steam-heated flat is expected to take care of the garbage from his own flat. The violation of the ordinance means a fine of not less than \$2 and not more than \$100.

WATER WORKS DEPARTMENT

WATER STATISTICS.

	Daily per capita consumption, gallons.	No. metered services.	No. unmetered services.	Total annual receipts.
Allentown, Pa.....	117	....	All	\$50,702
Auburn, N. Y.....	140	378	4,500	69,710
Boston, Mass.....	...	4,752	90,000	2,341,619
Brooklyn, N. Y.....	87	3,045	108,731	2,010,693
Buffalo, N. Y.....	255	2,000	65,000	651,500
Cambridge, Mass.....	85	619	13,430	305,359
Chicago, Ill.....	176	6,185	200,000	3,145,963
Cincinnati, O.....	121	2,773	32,700	813,862
Cleveland, O.....	161	2,810	50,000	725,639
Detroit, Mich.....	156	5,555	49,747	257,412
Duluth, Minn.....	81	1,098	1,537	93,444
Galveston, Tex.....	54	209	3,671	60,844
Holyoke, Mass.....	92	210	3,341	81,705
Kansas City, Mo.....	56	4,000	9,000	389,043
Lawrence, Mass.....	51	4,386	.....	95,820
Lincoln, Neb.....	62	1,560	1,896	39,031
Lowell, Mass.....	76	5,268	5,261	188,103
McKeesport, Pa.....	65	683	2,913	45,952
Milwaukee, Wis.....	84	12,552	25,639	338,630
New Bedford, Mass.....	99	1,095	8,056	111,125
Providence, R. I.....	54	17,124	3,896	522,124
Reading, Pa.....	83	600	14,693	138,713
Rochester, N. Y.....	82	7,944	20,298	365,056
Springfield, Mass.....	85	2,898	6,558	213,061
St. Louis, Mo.....	99	4,161	63,851	.....
St. Paul, Minn.....	50	4,063	11,530	167,343
Syracuse, N. Y.....	87	7,006	8,176	203,805
Toledo, O.....	53	5,015	6,085	125,793
Troy, N. Y.....	155	309	7,104	97,323
Washington, D. C.....	179	1,012	43,098	276,065
Worcester, Mass.....	33	12,235	761	243,944
Yonkers, N. Y.....	69	All	.....	135,976

THE AMERICAN WATERWORKS CONVENTION.

A MEETING of the local members of the American Waterworks Association was held in the Astor House, New York City, on Monday, February 25, to make arrangements for the coming convention of the association in this city. J. J. R. Croes, C. E., occupied the chair, and Peter Milne, C. E., acted as secretary of the meeting. Upon motion of John C. Kelley, President of the National Meter Company, a committee of twenty-one members was selected, with power to add to that number and fill any vacancies that may occur. The annual convention will be held in Manhattan Borough during the week of June 17, and it is proposed to use every endeavor to make this, the twenty-first annual meeting, a great success. A committee, consisting of W. R. Hill, C. E.; Peter Milne, C. E., and Lester E. Wood, was appointed to name the members of the standing committee of arrangements, which resulted as follows:

COMMITTEE.

W. R. Hill, C. E., Chief Engineer, Croton Aqueduct Commission.

George W. Birdsall, C. E., Chief Engineer Water Supply of New York City.

William Dalton, Commissioner of Water Supply, New York City.

Charles A. Moore, of Manning, Maxwell & Moore.

James J. R. Croes, C. E., President American Society Civil Engineers.

John C. Kelley, President National Meter Company.

D. W. French, Chief Engineer and Superintendent, Hackensack Water Company.

Anthony P. Smith, President, A. P. Smith Manufacturing Company.

John M. Diven, Superintendent Waterworks, Elmira, N. Y.

H. E. J. Porter, Bethlehem Steel Company.

Rudolph Hering, C. E., Manhattan.

Will J. Sando, International Steam Pump Company.

Charles A. Hague, C. E., Manhattan.

Fred A. Smith, Hersey Manufacturing Company.

John S. Warde, Superintendent Waterworks, West New Brighton, S. I.

Lester E. Wood, M. J. Drummond & Co., Manhattan.

S. T. Higley, Thomson Meter Company.

F. W. Shepperd, *Fire and Water*, Manhattan.

William S. Crandall, Editor of MUNICIPAL JOURNAL AND ENGINEER, Manhattan.

F. N. Whitcomb, Neptune Meter Company.

H. G. H. Tarr, of R. D. Wood & Co.

Murray Milliken, Mueller Manufacturing Company.

D. C. Toal, *Water and Gas Review*, Manhattan.

Peter Milne, C. E., Manhattan.

Upon motion Lester E. Wood was appointed temporary chairman and Peter Milne, secretary of the committee, and it was decided to call its members together on March 5, to appoint subcommittees and arrange further details of the convention.

PROGRESS OF FILTRATION IN PHILADELPHIA.

THE water consumption of Philadelphia is something enormous, being 280,000,000 gallons per day, which is almost equal to the combined consumption of New York and Brooklyn. New York consumes 226,000,000 gallons and Brooklyn 90,000,000. London consumes 240,000,000 gallons per day. The water consumption of Philadelphia is larger than that of any city in the world. It is believed that when the new filtration plants are installed and other improvements to the water supply are made, that meters will be put in, as engineers claim that the enormous water consumption shows much unnecessary waste.

Philadelphia has under way, or, to be more exact, will soon have in actual course of construction, one of the largest and most pretentious enterprises ever essayed by an American city. It is not only to filter every drop of water consumed in the city, but to alter and enlarge the whole water system. The impurity of the water supply, the lack of water in certain districts, and the utter inability to supply certain other districts were the chief arguments for the work now in hand. To accomplish this \$15,200,000 had been voted by the city councils, and a special bureau established under the Department of Public Works, at the head of which is Director William C. Haddock. Associated with him are George F. Webster, chief engineer of the Bureau of Surveys; Frank L. Hand, chief of the Bureau of Water; Samuel T. Wagner,

first assistant engineer of the Bureau of Surveys, who has been especially detailed to this work, and John W. Hill, of Cincinnati, O., who is consulting and principal engineer of the work.

In the outset several experimental filters were constructed at the Spring Garden pumping station, four being large filters, six tank filters and four other filters for experimental work to determine the efficiency and cost of filtration with substances in large reservoirs. The devices thus far in use were either originated in the bureau or are along the lines of plain sand filtration, such as is practiced largely in Europe, notably in London, Hamburg and Berlin. So far the experiments made have been quite satisfactory, but until the spring freshets, with the mass of vegetable impurities and clay in the water ultimately prove the efficiency of the devices in use, nothing positive may be asserted. At the experimental station tests are also being made of filtering materials most economically available in this vicinity, such as sand, gravel, broken stone and broken slag. Sand will be used in the final filters, but what grade will give the best results or where is the most favorable point for obtaining it has not yet been decided. This experimental plant has been in operation since September 1, 1900, and was designed so that it might be eventually a part of the permanent filtration plant. It has cost \$40,000, which sum includes the cost of all the apparatus, and likewise the cost of the material used in carrying on the chemical and bacteriological work.

Plans are completed for the Upper and Lower Roxborough filters, which will purify 20,000,000 gallons of water in twenty-four hours. The plans are almost completed for the Belmont filters for West Philadelphia, which will purify 35,000,000 gallons every twenty-four hours, and the plans for the great Torresdale filters are well under way. These filters will immediately handle 100,000,000 gallons every twenty-four hours, and will be enlarged as rapidly as possible to a capacity of 200,000,000 gallons. This will be the point from which will be handled the increased water supply from the Delaware River. Under the new plan but a limited amount of water will be taken from the Schuylkill River, the Delaware supplying the larger amount of water. There is, it has been determined, four or five times the least stream flow in the Delaware, while the drainage area is less densely populated than the Schuylkill. The Delaware River water is also much softer than that of the Schuylkill, as the latter river flows for a considerable distance through a limestone region.

The first contracts for actual work were signed February 11, the award for constructing the Lower Roxborough filter being made to Daniel J. McNichol, and the contract price being \$320,000. A contract for additional feeder pipes for the Roxborough and East Park districts, where the distribution service is to be improved and enlarged, was also awarded to Mr. McNichol, who will receive \$670,000 for the work. Contracts are about to be awarded for the Upper Roxborough filter and for the Belmont filters and settling basins. The new pumping machinery for the Torresdale district will first be installed at Laidner's Point on the Delaware, and then work will be commenced on the immense conduit which is to convey filtered water from Torresdale to Laidner's Point. From here it will be pumped throughout

the main water district of the city. This work about to be let will represent an outlay of over \$3,000,000. The conduit will be the largest single aqueduct in point of capacity in the world, from 300,000,000 to 350,000,000 gallons of water passing through it by gravity every twenty-four hours. The aqueduct will be driven through solid rock at an average depth of 100 feet beneath the surface of the ground and will be 2 65-100 miles in length.

SAND FILTRATION FOR WASHINGTON.

As the result of the hearing held in New York City on January 4, by the Senate Committee on the District of Columbia, to determine the relative adaptability of slow sand filters and mechanical filters for the purification of the water supply of the city of Washington and its suburbs, which was noted in our last issue, Messrs. Rudolph Hering, George W. Fuller, and Allen Hazen, all recognized experts on the filtration of public water supplies, were engaged to study the situation and to advise the committee as to the result. The conclusions reached by these gentlemen have just been made public, and may be summed up in the following extracts from their report:

"Practical experience with sand filters is much more extensive and more favorable than that with mechanical filters. Our knowledge of what they will do rests not alone upon experimental investigations, but upon actual use for many years by some of the largest cities in the world. * * * * * Our knowledge as to the results that can be obtained by mechanical filters rests more upon experimental evidence than upon results obtained in practice. * * * * * It appears from consideration of the evidence at our disposal that the average yearly bacterial efficiency of the two systems would be about equal. * * * * * There will apparently be but little difference in the cost.

After a full consideration of the various aspects of the problem, we are of the opinion that the long and favorable experience with sand filters, particularly in the light of the effect which they have had upon the health of the communities using them, should be given greater weight than the present evidence that American filters are able to give substantially equal hygienic efficiency. In view of the fact that there is no available evidence of decided advantage to be gained by adopting the newer method, we prefer in this case to adhere to the one supported by long precedent.

In consideration of the full evidence, we recommend the construction of a complete system of slow or sand filters, with such auxiliary works as may be necessary for preliminary sedimentation, and the use of a coagulant for a part of the time. There is no reason to believe that the use of this coagulant will in any degree affect the wholesomeness of the water."

The recommendation of the experts has been adopted by the Senate Committee on the District of Columbia, which in its report to the Senate recommends "for use in the District of Columbia the adoption of the slow sand system of water filtration, modified by the use of coagulants whenever the waters of the Potomac are so turbid and turbid for so long a period as to make the use of a coagulant desirable." The committee's report requires no specific action by the Senate, as the matter will be settled in connection with the bill making appropriations for the expenses of the District of Columbia, which as passed by the Senate appropriated five hundred thousand dollars for the installation of slow sand filters, and as passed by the House of Representatives appropriated the same amount but specified no system. The con-

ference committee representing the Senate and the House of Representatives has, however, just reported in favor of slow sand filtration, and it is extremely unlikely that the House will do otherwise than to adopt its report. Filtration of the water supply of the District of Columbia by slow sand filtration, with the use of coagulants when necessary, if at all, may, therefore, be regarded as an assured fact.

Messrs. Hering, Fuller and Hazen, while recommending slow sand filters for the District of Columbia, characterize the results of the experiments which have been made in mechanical filtration as worthy of the "greatest confidence." Incidentally they touch upon the notorious waste of water in the District and recommend for its prevention that meters be placed on all public buildings at once, and on private services, when deemed necessary, as rapidly as practicable.

WATER METERS PREVENT WASTE.

THE citizens of Norfolk, Va., for some time past, have been much perplexed about the water problem. The average daily per capita consumption amounts to 112 gallons, whereas, according to the best judgment, it should not exceed fifty gallons.

By the authority of the Councils, City Engineer Brooke has been making a careful investigation of the situation for several months past and has just rendered his report. In substance he concludes that the situation can be solved in two ways: (1) By the expenditure of nearly \$200,000 in enlarging the system; (2) By the installation of water meters.

The former would enable the city to meet the increasing demand for water, but it would not solve the problem, for the evil would still be present. On the other hand, if meters were installed it would reduce the waste to a minimum and make it unnecessary to increase the supply for years to come. Mr. Brooke recommends the adoption of the meter system, and in support of his position brings forward the testimony of those who have had experience in the use of meters and which demonstrates their positive value.

T. R. Dunn, City Engineer of Petersburg, Va., said: "We have in use about 1,300 meters, which are giving good results. Before their installation we pumped daily an average of 1,500,000 gallons. Within three months after installation our pumping was reduced to a daily average of 500,000, which average has not been exceeded after three years, notwithstanding a 300 increase in water takers. We never had any trouble with the water takers after the first two or three months, and if there is any objection to the system in the city we do not know it."

The city engineer of Danville, Va.: "It took me six years to persuade our council to adopt meters. It resolved itself into the question of expending \$40,000 for a new pump and main, or \$10,000 for meters, and the latter proposition was accepted. At the time of their adoption we had 836 water takers. The average daily consumption per capita was 126 gallons, and it ran up to 150 gallons in the summer. The pumping capacity was 1,500,000 gallons per day of twenty-four hours, and the pump was kept at work day and night, including Sundays, in order to meet the demand on the service. We purchased a meter for every service, and when half of them had been set, we had to discharge the night pumping force; when all were set the day force pumped only seven and one-half hours per day, and the supply was ample. The year before putting in meters we pumped 509,000,000 gallons; the year after, 183,000,000 gallons, and everybody had an abundant supply of water. The cost of water has been reduced from 50 to 60 per cent. Everybody is now in favor of meters, and the average daily per capita consumption is about thirty gallons."

Superintendent Bolling, Richmond, Va.: "I regard the meter system as the salvation of our water department. Four years ago at many high points along both business and residential streets, we had a very low pressure, giving no water to the second stories of hundreds of houses during the day time, and at times of very cold weather, when many fixtures were left open and wasting, scarcely any water on the first floors. I urgently recommended the adoption of the meter system as the more economical. Thus far we have expended \$25,000 for water meters and increased our water pressure 300 per cent.

C. E. Rowe, Secretary Water Works, Dayton, O.: "We have in use over 5,300 meters. Our experience is such that we would not change this system under any circumstances to the old method of assessing rates. It should also be considered that an enormous amount of water is saved, as a meter prevents waste and obliges a consumer to keep fixtures in repair. I believe if we were to remove all our meters, that within a week our pumping would increase from 40 to 50 per cent."

Edmund Mather, President Water Board, Harrisburg, Pa.: "Of course you have to be governed, somewhat, by the intelligence of the people with whom you have to deal, but it must be remembered that they do not understand the situation, and as a rule they have been educated to feel that they are entitled to all the water they can get by paying as little for it as possible. It is the worst kind of folly to have the pressure reduced in your mains by careless or ignorant people wasting water. It is fatal to economical management. Some people say, 'Water is free,' and so it is—in the river and in wells. But when you deliver it in the house under a pressure of from forty or fifty pounds per square inch, it costs money, and it is the service of the pumping, keeping the reservoir ready for emergencies, keeping street mains, valves and fire hydrants in repair that you are paying for—not the water."



A COMPARATIVE STUDY IN PARKS.

BY M. O. STONE, SECRETARY ROCHESTER PARK BOARD.

THE secretary of the Park Commissioners of Rochester, N. Y., Mr. M. O. Stone, has been filling in a good bit of his spare time during the winter season with the collection and compilation of a large amount of information relative to the park systems in cities of 25,000 population and over. The information includes the acreage, original cost and maintenance expenditures, and much else that will interest others. He writes:

"Of the 159 cities in the United States of 25,000 or more inhabitants, 122 have public parks. Forty-three of these cities have an average park area of but ten acres, and parks of the remaining seventy-nine cities vary in area from fifty to 7,000 acres. Public parks in twenty-five of the cities mentioned in the following table are under control of non-partisan park commissions. Park officials representing twenty-two of these cities make report that real estate near their parks has increased in valuation much beyond the average increase in other sections of the cities, and that the greater part of their taxpayers favor liberal appropriations for the purchase of park lands and the improvement and maintenance of parks.

	Population, census of 1900.	Average annual appro- priation for improve- ment and maintenance of parks for last 5 years.	Average annual cost per capita of main- taining and improving parks during last 5 years.	Average annual tax rate on \$1,000 for parks during last 5 years.	Annual cost per acre for improvement and maintenance.	Park acreage.	Acres pur- chased.	Purchase price.	Acres donated.	Acreage of interior parks.
Topeka, Kan.	33,608	\$5,500	\$0.16	\$0.30	\$63.00	87	17	\$10,000	80	..
Elmira, N. Y.	35,672	6,000	.17	.35	67.00	90	87.5	.....	2.5	3
Haverhill, Mass.	37,175	7,500	.20	.21	29.00	258	..	.....	..	8.1
Duluth, Minn.	52,964	12,000	.23	.30	43.00	280	200	250,000	80	25
Charleston, S. C.	55,837	9,000	.16	.25	15.00	608	608	.....	..	32.7
Peoria, Ill.	56,100	60,000	1.07	1.33	182.00	330	189.5	142,300	140	..
Springfield, Mass.	62,059	27,000	.44	.29	55.00	485	124.78	36,921	361	27
Wilmington, Del.	76,508	20,000	.26	.50	74.00	269	179.69	243,851	89.31	29.69
Hartford, Conn.	79,850	28,000	.35	.27	24.00	1,175	345	118,303	830	8
Grand Rapids, Mich.	87,565	(a) 22,500	.26	.27	165.00	136	57	.....	79	..
Albany, N. Y.	94,151	30,295	.32	.40	121.00	250	240	665,437	10	80
Los Angeles, Cal.	102,479	51,500	.50	.78	14.00	3,737	20	10,000	3,717	78.5
Omaha, Neb.	102,555	27,661	.27	.26	47.00	585	455	420,340	130	23
Fall River, Mass.	104,863	2,500	.24	.34	28.00	90	89.5	117,000	.5	.5
Paterson, N. J.	105,171	25,000	.24	.30	263.00	91	91	120,000	..	..
Worcester, Mass.	118,421	22,000	.19	.19	57.00	386	335	277,000	151	108
Allegheny, Pa.	129,896	50,000	.38	.51	147.00	341	28	40,000	313	100
Rochester, N. Y.	162,435	32,390	.19	.23	48.00	670	636	302,978	34	22
St. Paul, Minn.	163,632	50,000	.31	.32	86.00	579	527	239,000	52	22
Indianapolis, Ind.	169,164	(b) 92,500	.54	.50	77.00	1,204	1,194	410,000	10	84
Providence, R. I.	175,597	41,369	.24	.22	75.00	547	426	919,191	121	42.3
Minneapolis, Minn.	202,718	86,578	.42	.48	56.00	1,553	763	.....	790	59
Detroit, Mich.	285,174	179,259	.62	.57	193.00	926	732	245,000	194	78
Cincinnati, O.	325,902	45,000	.14	.13	106.00	422	420	.....	2	70
San Francisco, Cal.	342,782	(c) 245,000	.71	.69	175.00	1,400	1,390	.....	10	320
Buffalo, N. Y.	352,219	(c) 319,773	.90	1.30	311.00	1,026	1,026	1,156,337	..	70.5
Cleveland, O.	381,768	(a) 70,000	.18	.24	52.00	1,328	931	906,656	395	23.29
St. Louis, Mo.	575,236	112,940	.19	.21	51.00	2,183	1,748	1,399,944	435	60
Philadelphia, Pa.	1,293,697	550,000	.42	.49	162.00	3,396	3,316	6,300,000	80	..
Toronto, Ont.	90,000	(c) 65,000	.52	.31	50.00	1,300	1,075	.....	225	206

(a) Maintenance only.

(b) Average for 1900 and 1901.

(c) Appropriation for 1900.

"In San Francisco, the park board receives its annual appropriation through a tax of $\frac{1}{2}$ to 7-10 of a mill on each dollar of the city's assessed valuation; in Hartford the tax is fixed by law at not less than $\frac{1}{2}$ of a mill, and in Minneapolis it must not exceed 1 mill.

"Paterson has a fixed rate of 2-5 of a mill, and Peoria 6 mills on each dollar of assessed valuation. The method by which the parks of the last two cities named obtain funds for maintenance is undoubtedly the best for nearly all cities, as park boards are thus assured of fixed amounts annually, and are in position to act intelligently upon business methods.

"Public parks in the other cities in this table receive appropriations from their common councils which vary in amounts from year to year. By act of the Legislature, the park commission of the city of Rochester can not be granted an annual appropriation exceeding \$40,000. This amount has been appropriated but one year—1896.

"About one-half of the park commissions in these cities supervise and pay for their park policemen; twenty-seven have band concerts in parks, ten have equipped gymnasiums, twelve have golf grounds, fourteen provide for skating, seventeen park systems have boating privileges, and in eighteen there are ball grounds; seventeen have greenhouses and conservatories, eighteen have collections of native and other animals, and fifteen have nurseries in which are grown trees and shrubs for park planting.

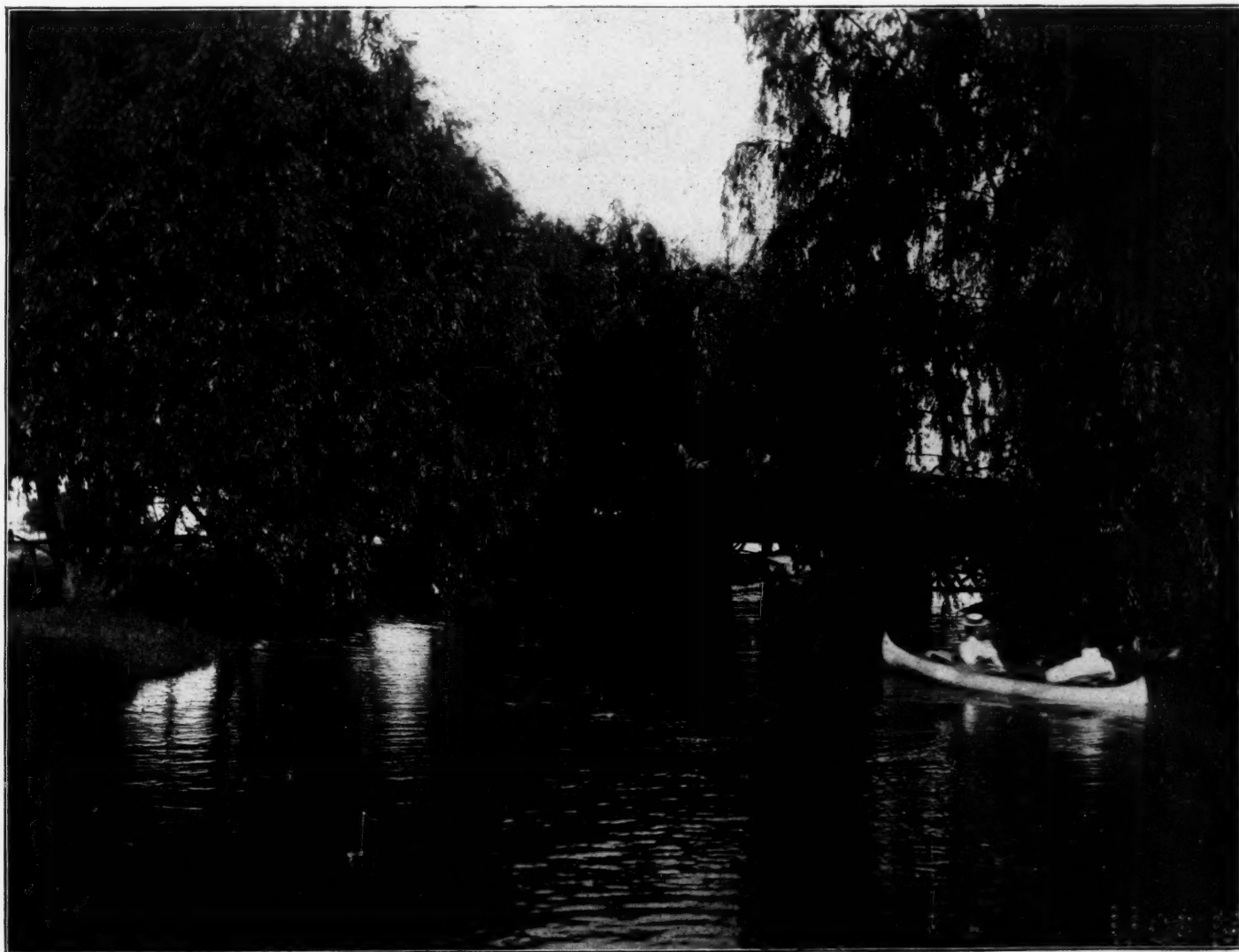
"Street trees are under the control of park commissions in six of these cities, and in eight there are park boulevards, or parkways. In eight cities street railways run into the parks. Park laborers work eight hours per day in nineteen cities; nine hours in one city, and ten hours in eleven cities. One city pays \$1 per day for park laborers, twenty-one pay \$1.50, two pay \$1.60, three pay \$1.75, and five pay \$2."

THE PARKS AND BOULEVARDS OF DETROIT.

BY R. J. CORYELL, DETROIT, MICH.

THE park system of this city, containing 1,139 acres, is composed of three principal parks, twenty-five smaller parks or parkways, and nearly twelve miles of boulevard.

Belle Isle Park, the gem of the system, is an island of 700 acres in the Detroit River, lying about three miles above the center of the city, at the foot of Lake St. Clair. It contains about 200 acres of virgin forest, which is filled not only with monarchs of ancient age, but vigorous trees that have not yet reached their prime, and a dense undergrowth of seedling trees, shade-loving shrubs and vines, and many species of herbaceous plants. This forest is intact, except that it is traversed with a few driveways. Over one-half of the remainder of the park is well wooded, but it is clear from undergrowth, and given up to public use. The park, besides being surrounded by the pure water that flows from the great lakes, is interspersed with a chain of lagoons and canals, so designed that there will be a natural flow of water throughout their entire length. The ground is almost a perfect level, and what is lost in making grand pictures of landscape scenery, is gained in being able to use every square foot of space for park purposes, and the ease in which it is all kept green during the summer droughts.



VIEW IN BELLE ISLE PARK, DETROIT.



CLARK PARK LAKE IN WINTER.

Palmer Park, the next in size, comprises 134 acres of land, lying seven miles directly away from the river. It contains about forty acres of dense woods, which are traversed by trails only sufficiently wide to allow the passage of a vehicle. The remainder is a meadow nearly level, skirted by several irregular belts of woodland. This park contains the famous log cabin which was made and filled with relics of pioneer days by the donor of the park, Ex-Senator T. W. Palmer. The plan is to keep this park as near to nature as possible, consequently the landscape is bordered with native trees and shrubs, and the floral decorations are those of the neighboring fields and shrubs, excepting the log cabin surroundings, which are embellished with flowers in the style of long ago. A horse shelter is made of rough poles, with a thatched roof, and the horse drinking trough is a hollowed log, while the drinking fountains are in the nature of a spring in a rocky ledge. A few barnyard bowls add to the cabin surroundings, and a log shelter at the park entrance, to protect the visitor while waiting for the street cars, all tend to illustrate the pioneer home; to show much of nature and little of art; to keep green the memory of the past, without intruding on the progress of the present and future.

Clark Park, a piece of wooded land containing twenty-four acres, lies at the opposite end of the city from Belle Isle Park, and in the center of a large manufacturing district. It is constantly thronged with picnickers; with boys sailing their toy boats on a miniature lake; with girls playing their childhood games, or waiting their turns at the swings; and during the evening, with a large proportion of the residents of that locality; all of which proclaim this to be the breathing place for more people in proportion to its area than any other of Detroit's numerous parks, and is one of the best illustra-



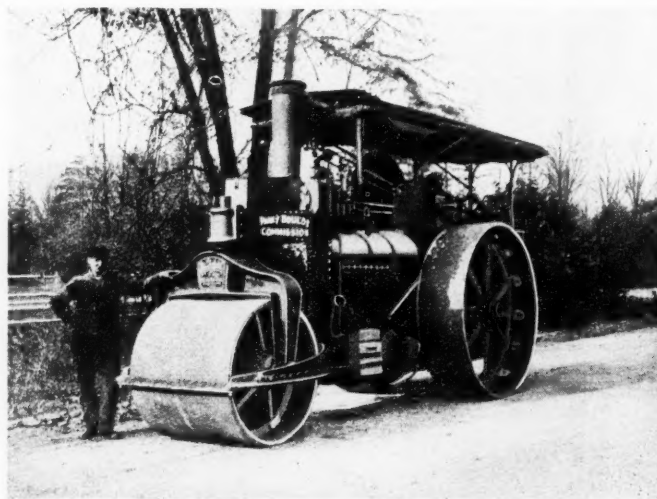
THE OLD WAY OF MAKING ROADS.

tions of the benefit of small parks in various parts of the city.

The Grand Boulevard skirts the city on three sides. Beginning at Belle Isle bridge, it followed very closely the city limits at the time it was laid out, and ends near the river below the city. It varies from 150 to 200 feet in width; where laid out with double driveways, the roadways are from thirty to forty feet wide, and fifty feet where but one driveway exists.

The twenty-five small parks, running from ten acres each down to small areas, are well distributed throughout the city. Within the radius of one-half mile from the City Hall there are twelve of these parks, and they are of incalculable benefit to the residents as well as visiting strangers.

Belle Island Park is reached by ferryboats, which ply every twenty minutes from the center of the city, two and one-half miles distant, and by a bridge one-half mile long. The bridge approach is on three different car lines, and on busy days five lines of cars are run to this point.



THE NEW WAY OF MAKING ROADS.

The Commissioners of Parks and Boulevards run a phaeton service from the car line to the casino on the park, which is nearly one mile distant, the fare being three cents. The phaeton service is extended around the park, and a drive of nearly five miles is given for ten cents, these fares being no more than sufficient to maintain the service.

The other parks are all accessible to the street cars, and all are reached by well-paved streets, and the entire system is largely patronized by drivers and riders of bicycles. All parks are liberally provided with settees, and the larger ones with swings. Ice water is furnished on Belle Isle and Palmer Parks, and is now being rapidly extended to the other city parks. The ice is contained in a cistern, in the bottom of which the water in coils is connected with the city water system, and is thoroughly cooled at all times in a sanitary and economical manner. The ice is gathered and stored by the park board, who use annually about 2,500 tons. Toilet buildings of durable construction, and with the most sanitary appliances, are well distributed through the larger of the parks.

Picnic tables, ice water fountains, with settees and swings, determine the points where picnicking is encouraged. Waste paper baskets are provided in sufficient numbers which aid much in keeping the lawns in a tidy condition.

The landscape portion of Belle Isle Park, containing about 150 acres, also the small parks, are kept well watered in times of drought, which adds much to their inviting condition. Throughout the smaller parks pipes are laid underneath the surface of the ground in such a way that fifty feet of hose will reach any portion of the lawn, and in all cases, water is allowed to run out at the open end of the hose, and the lawn is irrigated at very little expense, as one man is able to take care of a number of sections.

The water is provided by the Board of Water Commissioners, and the lighting of the parks, which is well done, is furnished by the Public Lighting Commission, both of which are municipal bodies.

Band concerts are furnished throughout the summer months by a band of good reputation, giving thirteen concerts per week, two on week days and one on Sunday afternoon, they being given in various parts of the park system.

The refreshment privilege of Belle Isle casino and skating pavilion and at Palmer Park casino are leased, as are also the pony, boating and bicycle privileges on Belle Isle Park. The bath house at Belle Isle Park is maintained by the commission, in which there is a free department, a five cent charge for lockers and ten cent charge for rooms.

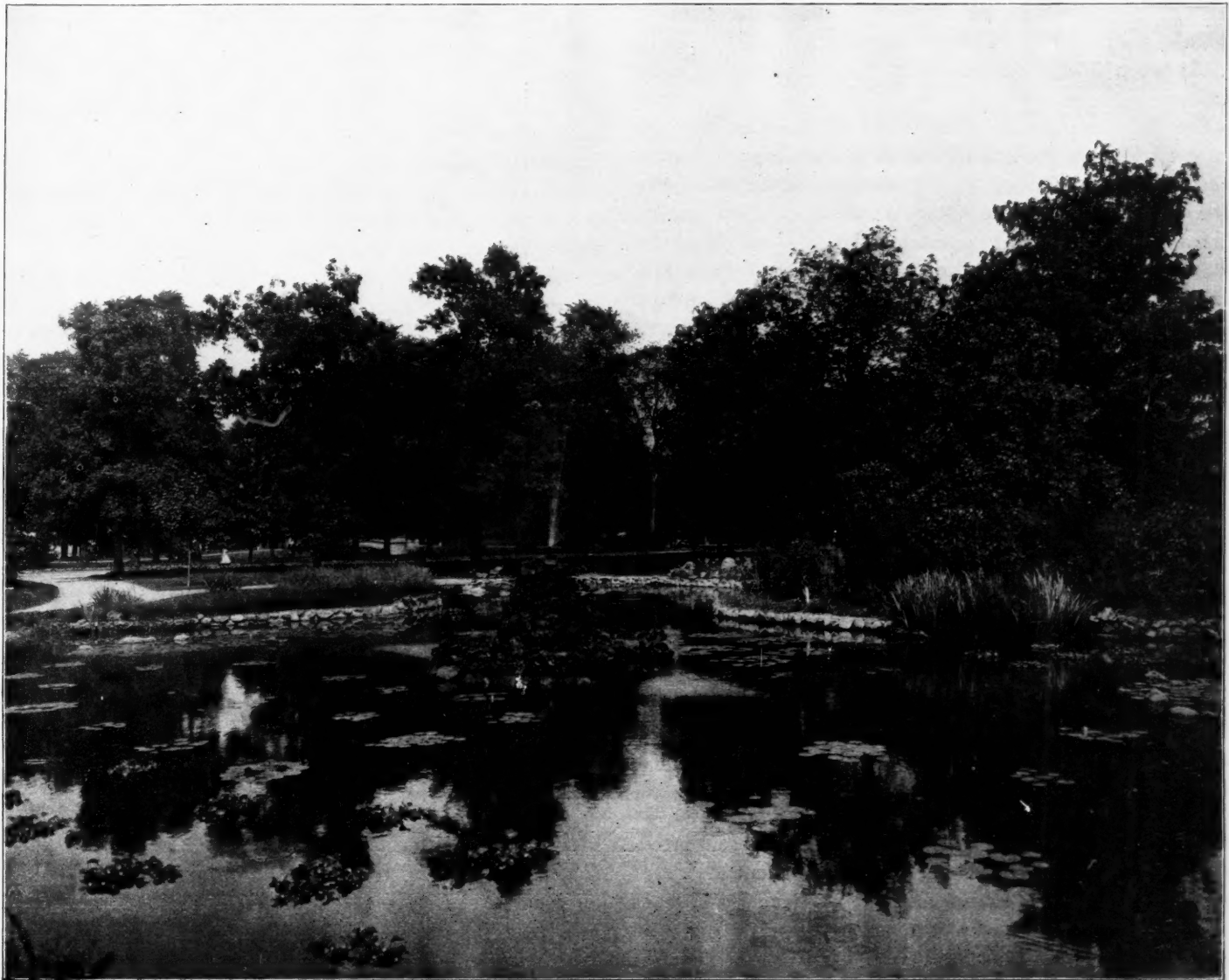
Skating lakes are maintained at Belle Isle, Palmer and Clark Parks, free to all, and are largely patronized.

A portion of Belle Isle Park is devoted to a zoological garden, containing hardy specimens in ample paddocks.

On Palmer Park has been established a botanical garden of Michigan plants, containing about ten acres.

Everything is done to aid all people in reaching and enjoying the parks, and everything in the way of amusements that would cost money, no matter how small a sum, is excluded, excepting as noted above.

The driveways of the park system are of macadam construction. On the parks slag is used as foundation, but henceforth granite will be used for surfacing, while in the past they were made of gravel. The boulevard driveways are made with crushed stone foundations, with granite surfacing. The foot walks are built with six inches of slag for foundation, on top of which is placed sufficient cinders to well cover the slag, and bring the foundation to a true grade. This is covered by a surfacing of one inch of limestone dust, on which is sprinkled a layer of river sand, to obscure the glare of the limestone. These walks, for summer use, are as hard and firm as artificial stone, and in appearance resemble them very much. Slag, cinders and river sand cost only the



VIEW IN BELLE ISLE PARK, DETROIT.

hauling, which is about twenty-five cents per cubic yard leveled in place.

The limestone dust is a waste product at the quarry, and costs there five cents per ton loaded on the cars; delivered at our parks, the cost is about seventy cents per cubic yard. This construction makes a walk that people use instead of walking on the grass.

There are raised in the greenhouse department about 200,000 plants annually, which are set out on the park system. A nursery department has been started, in which a large number of trees and shrubs are being propagated for park use.

From fifty to sixty horses are owned by the park commission, by which most of the team work in maintenance is done.

The cost of the park system, including the purchase of Belle Isle Park and a portion of Clark Park, with the cost of maintenance and improvement from 1853 to July 1, 1900, is \$3,309,304.09. The purchase of Belle Isle Park and that portion of the boulevard which was not donated and the cost construction was done by bond issue. Otherwise, the fund has been raised by direct taxation. The appropriation for the past fiscal year was \$173,000, of which about \$100,000 is required for maintenance. The acquirement of the Grand Boulevard is looked upon by the people of the city as an addition to the park system, without general cost to the taxpayer, as the taxes raised by the increased valuation will pay for its bonds when due, its maintenance and its future improvements.

The park commission is composed of four members, appointed by the mayor and confirmed by the common council, who hold office for four years each, one retiring each year. The executive head of the system is the secretary and general manager. The general superintendent has charge of the outside work, and under him are overseers of Belle Isle, Palmer and city parks and boulevards. Competent foremen are employed in the following departments: Floriculture, forestry, carpentry, bath house and barns and horses.

The park commission has power to do the policing of the park system, but much is done by the metropolitan police, although care takers of the city parks, patrolmen on the boulevard, and foremen on the various works, are sworn police officers, provided with badges, and do much to protect the system from minor depredations.

A system of daily reports is made to the office, showing the number of men who have worked, length of time, and what has been accomplished, and the overseers and foremen in charge of the work are held responsible for matters under them. Much attention is given to keep the entire system neat and tidy, which is believed to be the main point that has given the park system a favorable reputation throughout the country.

A combined aquarium and horticultural building is about to be erected on Belle Isle Park, at a cost of \$150,000, the money being raised by a bond issue. A few other improvements are contemplated in the way of permanent bridges, a better surfacing of roadways, and the construction of many small conveniences, which will aid the people in their outdoor enjoyment.

The policy of the commissioners of parks and boulevards is that the parks shall always be open to all citizens on abso-

lutely equal terms; special privileges to no one, nor the use of the parks for any purpose not practically common to all, and consistent with the proper use of public parks, and also to keep them close to nature, improve the lawns, add trees, shrubs and plants, and all things that will make the parks the rural resting places, the summer homes and the recreation grounds of the people of Detroit, with their visiting friends and tourists.



—Atlantic City, N. J., feels the need of an additional fire house.

—Charles S. Allen is the new chief of the Trenton, N. J., fire department.

—Fire Commissioner Scannell, of New York, recommends the establishment of a department of fire supplies.

—The city of Cambridge, Mass., is seeking authority from the State legislature to construct its own electric conduits.

—Chief Hogg, of Binghamton, N. Y., in his annual report recommends the purchase of several combination wagons.

—Indianapolis has given an order for the installation of the Gamewell fire alarm telegraph. The new system will cost about \$70,000.

—Kingston, N. Y., citizens are advocating the organization of a paid fire department as the result of the blunders of the volunteer service at a recent fire.

—Those interested in fire matters in Connecticut want a State fire marshal's department similar to that of Massachusetts, Ohio, Maryland, and other States.

—Chief Charles F. Lauer, of the Columbus (O.) department, recommends the addition of three new engines and a new switchboard for the fire alarm telegraph.

—B. P. Sullivan, of New Orleans, has a great deal to say in favor of the horseless fire engine which was installed in the New Orleans department not many months ago.

—Chief Quigley, of Syracuse, N. Y., has been complemented by the National Board of Fire Underwriters. At the same time they recommend \$100,000 worth of improvements.

—James W. Dickinson, who has been at the head of the Cleveland Fire Department for many years, has been obliged to step down and out because he was not a sufficiently good partisan politician.

—The Windy City has turned out another enterprising man—the fire extinguisher promoter who has been setting fires for the sake of having an opportunity to show the qualities of his invention.

—The Board of Fire Commissioners of Trenton, N. J., are anxious to get ideas for a model combination fire house, which it is expected will be built this year. If the city possessing the model house will send the plans and drawings to THE JOURNAL they will be reproduced for the benefit of other readers.

FIRE STATISTICS IN LARGEST CITIES.

TABLE NO. 1.

Cities.	Area, sq. miles.	Population.	No. of alarms.	Total fires.	Con- fined building.
Allegheny, Pa.....	7.75	129,896	124	124	....
Baltimore, Md.....	32.50	508,957	1,229	1,229	1,183
Boston, Mass.....	37.04	560,892	1,768	1,568	1,502
Buffalo, N. Y.....	42.	352,219	1,012	1,012	991
Chicago, Ill.....	190.63	1,698,575	7,811	6,165	5,928
Cincinnati, O.....	36.50	325,902	1,014	1,006	989
Cleveland, O.....	35.	381,768	1,513	1,513	....
Columbus, O.....	16.25	125,560	561	551	536
Denver, Col.....	54.	133,859	488	488	488
Detroit, Mich.....	29.	285,704	1,083	1,083	....
Fall River, Mass.....	41.	104,863	203	203	202
Indianapolis, Ind.....	29.	169,164	957	957	....
Jersey City, N. J.....	17.	206,433	582	582	563
Kansas City, Mo.....	26.	163,752	1,142	1,114	1,063
Los Angeles, Cal.....	60.	102,479	355	309	296
Louisville, Ky.....	20.	204,731	671	400	339
Memphis, Tenn.....	16.	102,320	362	235	177
Milwaukee, Wis.....	23.	285,315	1,326	1,106	1,103
Minneapolis, Minn.....	56.	202,718	1,035	1,035	951
Newark, N. J.....	21.	246,070	586	454	444
New Haven, Conn.....	22.50	108,027	287	287	286
New Orleans, La.....	60.	287,104	453	453	358
New York, N. Y.....	308.	3,437,202	9,130	8,053	7,703
Omaha, Neb.....	26.50	102,555	421	356	331
Paterson, N. J.....	8.75	105,171	378	378	365
Philadelphia, Pa.....	129.50	1,293,697	2,925	2,761	2,685
Pittsburg, Pa.....	28.39	321,616	438	438	....
Providence, R. I.....	18.29	175,597	939	939	922
Rochester, N. Y.....	25.	162,435	360	360	....
San Francisco, Cal.....	38.87	342,782	911	872	726
Scranton, Pa.....	19.06	102,026	250	250	245
St. Joseph, Mo.....	11.	102,979	278	278	267
St. Louis, Mo.....	61.75	575,238	2,091	2,091	1,965
St. Paul, Minn.....	55.	163,632	694	658	585
Syracuse, N. Y.....	22.50	108,374	284	284	275
Toledo, O.....	30.	131,822	625	573	570
Washington, D. C.....	73.	278,718	667	528	528
Worcester, Mass.....	36.	118,421	499	499	495

TABLE NO. 2.

Cities.	Total value involved in fires.	Total loss thereon.	Total insur- ance thereon.	Total Loss per insurance capita. loss.
Allegheny, Pa....	\$196,543	\$1,608,098	\$196,543	\$1.51
Baltimore, Md....	446,041	3,720,762	427,995	.84
Boston, Mass....	1,699,900	19,471,668	1,500,963	2.67
Buffalo, N. Y....	\$3,176,190	796,322	4,400,456	....
Chicago, Ill.....	128,304,413	....	40,553,636	5,740,058 3.37
Cincinnati, O.....	....	985,860	3,985,499	905,689 2.76
Cleveland, O.....	....	....	4,949,475	1,530,495 4.00
Columbus, O.....	....	422,905	1,533,115	414,006 3.29
Denver, Col.....	....	205,615	3,837,255	185,376 1.38
Detroit, Mich.....	5,205,645	633,003	3,662,533	....
Fall River, Mass.	10,919,085	231,078	10,248,885	227,993 2.17
Indianapolis, Ind.	No report given.	....	....	....
Jersey City, N. J.	....	220,814	785,050	178,014 .86
Kansas City, Mo.	11,694,994	1,223,910	8,996,149	1,051,082 6.41
Los Angeles, Cal..	....	423,730	....	....
Louisville, Ky....	2,851,200	....	2,280,962	376,465 1.83
Memphis, Tenn..	2,298,692	852,867	1,950,994	691,637 6.75
Milwaukee, Wis.	32,329,113	417,580	23,004,150	393,813 1.39
Minneapolis, Minn.	....	605,384	3,240,432	621,136 3.06
Newark, N. J....	4,000,000	218,152	3,859,020	180,000 .73
New Haven, Conn.	1,170,989	86,389	732,675	63,335 .58
New Orleans, La.	4,915,895	554,552	3,452,721	393,467 1.37
New York, N. Y.	....	11,277,311	156,388,678	10,320,878 3.00
Omaha, Neb.....	4,756,554	372,706	2,795,952	322,928 3.14
Paterson, N. J....	....	165,150	2,709,950	158,924 1.51
Philadelphia, Pa..	....	4,026,352	56,473,410	3,818,092 2.90
Pittsburg, Pa....	....	391,121	3,716,347	379,214 1.17
Providence, R. I..	....	335,762	5,708,839	286,818 1.63
Rochester, N. Y.	No report given.	....	....	....
San Francisco, Cal.	13,847,032	754,687	5,538,813	659,610 1.91
Scranton, Pa.....	....	....	1,230,450	195,620 1.81
St. Joseph, Mo....	1,278,821	30,093	1,067,368	24,877 .24
St. Louis, Mo....	11,272,380	....	9,017,904	934,160 1.62
St. Paul, Minn....	....	....	3,552,013	404,898 2.47
Syracuse, N. Y....	2,404,876	303,050	1,851,578	286,799 2.64
Toledo, O.....	....	764,684	5,954,892	760,869 5.77
Washington, D. C.	....	466,590	....	320,571 1.15
Worcester, Mass.	4,118,963	166,712	3,295,171	156,753 1.32

THE CHARLESTON FIRE DEPARTMENT.

THE last annual report of Chief Marjenhoff, of Charleston, S. C., makes a splendid showing, and speaks well for the efficiency of the force. There were 118 alarms during the year, and a total loss of \$17,592.87 on property valued at nearly \$400,000, and which was insured for more than \$200,000.

The total valuation of the department, including real estate, houses and equipment, is \$132,240.05. There are seven well organized companies, and the department has what is seldom found in Northern cities, a drill tower and training school, which is under the direction of Assistant Chief Berhans, who spent two months in the New York training school last year to prepare himself for the work.

HISTORY OF MUNICIPAL ELECTRICIANS.

The International Association of Municipal Electricians has just published the proceedings of its fifth annual convention, which was held at Pittsburg last September. Published with it is a historical sketch of the organization, with portraits of the officers and directors.

The book is gotten up in elegant form, bound in turkey morocco, and comprises over 200 pages. It is a credit to the association, and contains matter which will be of lasting value to those interested in fire matters, and particularly the telegraph and electrical side of the question.

A MOVE IN THE RIGHT DIRECTION.

The Nebraska State Volunteer Firemen's Association has taken a step in the right direction in passing the following resolution:

"The dangerous construction and condition of chimneys, fireplaces, hearths, stoves, stove pipes, ovens, boilers, apparatus used in and about any building or manufactory, and to cause the same to be removed, or placed in a safe condition as the council may prescribe, when by it considered dangerous; to regulate and prevent the carrying on of manufactories dangerous in causing and promoting fires; to prevent the deposit of ashes in unsafe places, and to cause all such buildings and inclosures as may be in a dangerous state, to be put in a safe condition."

Secretary Miller is reminding his fellow chiefs by means of a circular letter of their good resolution at the last convention.

THE TOPEKA DEPARTMENT.

Chief Wilmarth, of the Topeka, Kans., Fire Department, has a force of thirty men—all paid full time—which is divided into seven companies.

The Gamewell fire alarm telegraph is in service, with thirty-two miles of wire, divided into four circuits and forty-six street alarm boxes.

The fire stations are all modern, and equipped with up-to-date appliances.

Each member of the department is allowed six regular "off's" of twelve hours each (alternating nights and days) every month, and also a vacation of ten days annually, with pay. There are four regular substitutes in addition to the regular force, to fill vacancies.

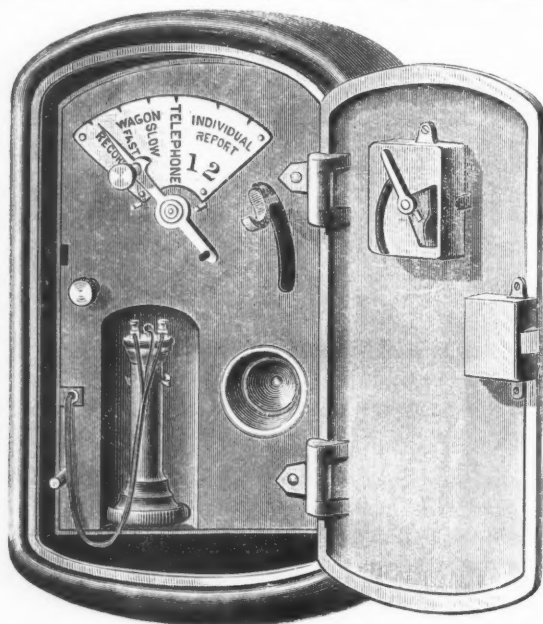
The annual expenses of the department are \$27,000.

The city has recently completed a large city hall, at a cost of about \$100,000. In this building is the new headquarters of the fire department, which is one of the finest and best equipped fire stations in the West.



HAVANA INSTALLS POLICE TELEGRAPH.

THE improvements which have been made in the city of Havana, Cuba, since the war ended are something to more than astonish the natives; they even astonish some people who are somewhat farther advanced in civilization. From a sanitary point of view, the city was redeemed some time ago, and notable advancement made in other directions, so that its most feared epidemic, "Yellow Jack," has lost much



of its terror, because it has become a comparative stranger to that city. And all on account of the adoption of modern methods of cleanliness and sanitation and the enforcement of a few simple rules and regulations which are calculated to promote the health of cities of that size, especially in warm climates.

Lately it has taken another step forward and installed an up-to-date police telegraph system, which was recently completed by Wendell & MacDuffie, the foreign agents of the Gamewell Company, of New York City.

The contract was awarded some months ago. The system used in Havana is identical with the one in use in about 90 per cent. of the cities in the United States.

The system will promote discipline on the police force. Each patrolman will be required to report every half hour, and any failure to do so without a very good excuse will be treated as a misdemeanor and the guilty one will be fined.

"Another good result is the reduction of the number of policemen," says a leading citizen. "Havana has far too

many policemen for so small a city. Before the advent of the police telegraph system this large number was necessary, because the officer making an arrest was obliged to accompany his prisoner to the police station, whereas now he can bring the patrol wagon to his aid with additional assistance by simply touching the button."

One of the features which makes the addition of this system particularly valuable to the city is a provision made by which the same system can be used for sending in fire alarms. By the old method, when a patrolman discovered a fire he had next to hunt up a telephone over which to send in the alarm. With the new system a touch of the button will not only give the alarm, but indicate at headquarters in what portion of the city the fire is to be found.

One of the novel provisions of the installation of this police telegraph is that which adds practically 600 members to the force. There have been 600 extra keys provided, any one of which will fit all the boxes. These keys have been distributed among the most reputable citizens in different parts of the city, with instructions to use them when occasion demands, either in case of a fire or of a disturbance requiring the presence of the police. Each key is numbered and the name of the owner is kept at police headquarters. The key is so made that while it is an easy matter to insert the key and send in an alarm, it is impossible for the one using it to take it out until the arrival of the proper official. This has already been the means of restraining the work of the practical joker.

If these improvements continue at the present rate it will not be long before winter tourists from the United States will throng Cuba, for all it has lacked in the past has been the addition of the modern conveniences in every branch of the public and private service, found to be so essential to present day life.

PHILADELPHIA'S POLICE FORCE.

THE police department of Philadelphia, according to the report of Superintendent of Police Harry M. Quirk, now in the hands of the mayor, consists of a grand total in the bureau of 2,779 persons. Of this total, 1,890 are in the various police districts, of which there are thirty-four each in charge of a lieutenant; 116 belong to what is called the Reserves, men who because of their physique and experience are detailed to posts in the congested district to guide pedestrians at street corners and the like, and twenty-eight men are in the harbor squad. The thirty-four police districts are divided among five captains, who are each in charge of a division. In the suburbs and outlying districts are 150 mounted men, and in the favorable seasons a bicycle corps of twenty-one men is maintained. All but two of the police districts are provided with patrol wagons, and the police telegraph system is in use throughout the city.

Philadelphia is not as liberal in police salaries as most of the larger cities. Patrolmen are only paid when on actual duty, and pay is graded according to length of service from \$1.75 to \$2.75 per day. Forty dollars a year is allowed for uniforms.

The police are not regularly drilled, nor is there any pistol practice except on occasions. Superintendent Quirk has suggested gymnasiums at the various station houses, and an application for this necessary adjunct will be made this year.

POLICE STATISTICS.

A STUDY of the following table of police statistics indicates some interesting conditions. As might be expected, in most cases the arrests for drunkenness increase with the increase in the number of saloons. Philadelphia, Boston, and some of the smaller cities are exceptions to this rule. Conditions which statistics will not reveal seem to prevail in these cities, and for some unknown reason plain drunks multiply.

	No. Police men.	No. retail saloons.	Arrests for drunkenness.	Total arrests.
New York, N. Y.....	7,637	10,832	44,013	138,875
Chicago, Ill.....	3,085	6,460	40,279	71,914
Philadelphia, Pa.....	2,372	1,709	28,698	62,185
St. Louis, Mo.....	1,255	2,060	3,974	24,420
Boston, Mass.....	1,243	799	23,896	39,760
Baltimore, Md.....	820	1,988	3,819	29,335
Cleveland, O.....	355	1,888	7,636	15,674
Buffalo, N. Y.....	663	1,510	9,971	23,338
San Francisco, Cal.....	589	3,007	12,827	27,769
Cincinnati, O.....	525	1,727	1,988	12,860
Pittsburg, Pa.....	348	518	4,670	18,762
New Orleans, La.....	307	1,370	5,241	17,609
Detroit, Mich.....	513	893	2,009	7,052
Milwaukee, Wis.....	304	1,747	1,756	4,873
Washington, D. C.....	545	513	3,136	25,923
Newark, N. J.....	358	1,300	2,015	6,262
Jersey City, N. J.....	350	1,002	3,950	7,600
Louisville, Ky.....	339	880	1,481	7,704
Minneapolis, Minn.....	201	323	2,065	5,416
Providence, R. I.....	300	400	5,803	8,663
Indianapolis, Ind.....	171	521	1,019	5,454
Kansas City, Mo.....	173	429	1,594	11,902
St. Paul, Minn.....	179	298	1,445	4,692
Rochester, N. Y.....	193	618	1,046	2,688
Denver, Colo.....	86	321	883	5,345

HEALTH DEPARTMENT



—The undertakers of Rochester, N. Y., are now required to pay twenty-five cents for each death certificate which accompanies a body out of the city.

—The New York State Legislature has another bill under consideration which proposes to curtail the liberties of the Christian Scientists and faith cure people.

—The State health authorities of Michigan propose to secure an appropriation of \$50,000 for the purpose of opening a sanitarium for the treatment of tuberculosis.

—The New Jersey State Board of Health is following the example of Dr. Ernest Wende, Health Commissioner of Buffalo, N. Y., in taking steps to disinfect library books and libraries in general, at regular intervals.

—The State Board of Health of New York applied the tuberculin test of 3,247 cattle last year of which number 184 were condemned, and of the latter number 142 were destroyed. Awards amounting to \$1,428 were made to sixty-four owners of cattle destroyed.

—Baltimore is planning to improve and enlarge its free public baths, which were opened to the public for the first time last year. Los Angeles, Cal., has been agitating for a long time the question of establishing a free public bath. Recently a site was secured and work will begin upon the proposed improvement at an early date.

THE Municipal League of Scranton, Pa., has been gaining for itself and its city a national reputation by means of the reform work it has been conducting recently.

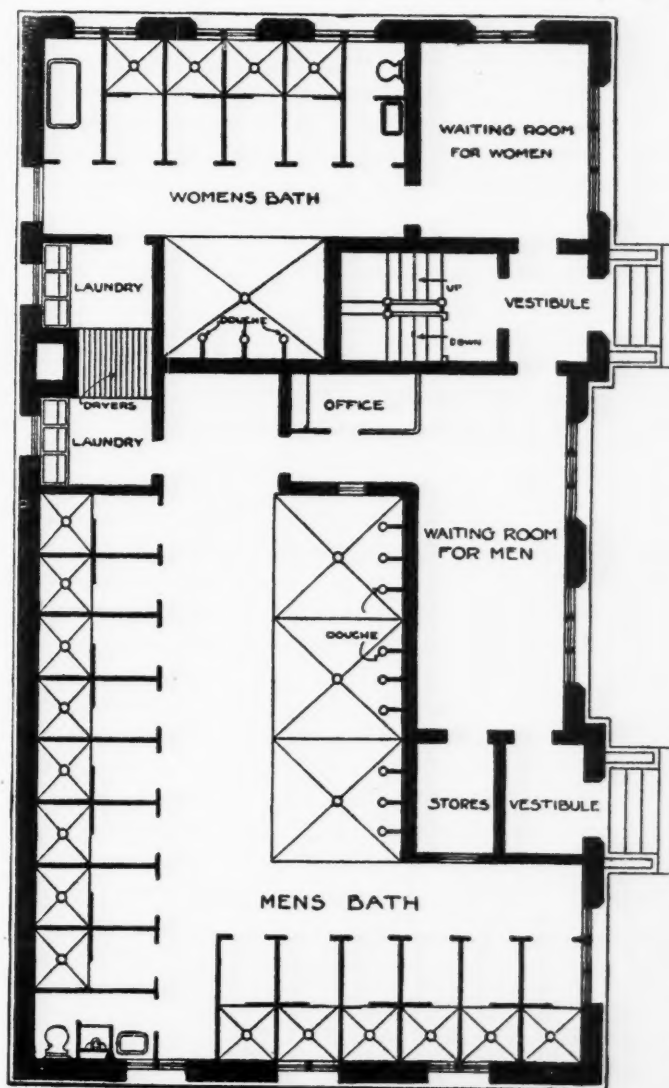
BUFFALO'S NEW BATH HOUSE.

THE United States has no more progressive municipality than Buffalo. It leads in some things and is up-to-date in all that is going. It was the first city in the Empire State to run



BUFFALO BATH HOUSE NO. 2.

an all the year round public bath; and it claims to be the first city in the country to operate a free public bath. Bath House No. 1 was opened several years ago. The cost of construction, including the site, amounted to less than \$15,000.



BUFFALO BATH HOUSE NO. 2—GROUND FLOOR PLAN.



BUFFALO BATH HOUSE NO. 2—WAITING ROOM.

It has been operated at an exceedingly low annual cost and has given thousands of men, women and children free public baths annually, furnishing each bather with an individual piece of soap and a clean towel without charge.

The popularity of No. 1 made the construction of Bath House No. 2, upon a much larger scale, necessary, and the latter has been in use for about two months. The first bath house had no separate compartments for men and women, but the new house has been constructed upon the broader plan and is about double the capacity of the other.

During the month of January there were 4,725 men, 808 women and 5,424 children, or a total of 10,957, who availed themselves of the free bath privilege. As will be seen by the accompanying illustrations the bath house is constructed after the most approved style and careful attention has been given to all sanitary precautions.

At the request of the MUNICIPAL JOURNAL AND ENGINEER, Dr. Ernest Wende, the efficient Health Commissioner, has furnished the photographs and the detailed cost of the house, including equipment. The land cost \$2,600; the building, \$15,011.45; the equipment, about \$500; and the laundry and dryer, which is not yet installed, \$240; making a total cost of \$18,351.45.



BUFFALO BATH HOUSE NO. 2—SHOWER BATH.

The cities of Europe and Great Britain have a larger number of public baths than those of America, but almost without exception a small fee is charged, a practice which has not been generally followed in this country. Most of the institutions of the kind in English cities are made self-supporting. This may be made necessary by the fact that the bath houses are constructed upon a larger and much more elaborate plan than in America. Pounds are invested over there, where dollars are expended here.



The book on "Street Pavements and Paving Materials," by Geo. W. Tillson, which was mentioned in this department last month, is deserving of a more extended notice than can be given. Although by no means to be classed among the old men, Mr. Tillson has had a long and varied experience connected with great responsibilities, out of which he has taken the material for his work.

Being a city engineer, he can and has presented the subject in a manner best calculated to lend itself to the assistance of the engineering fraternity throughout the country. At the same time, he has adapted it to the lay reader, so that, taken with the many illustrations which are freely used, the average city official who lacks a technical education in this line of public improvements, will find much which will interest and instruct him. The book should find a place in the library of every city engineer and of every other official who is directly connected with the laying of pavements. In this connection it is well to suggest that the city should see that its chief engineer has the book at the city's expense.

* * *

The "Proceedings of the Sixth Annual Meeting of the National Municipal League" have just been published by the secretary, Hon. Clinton Rogers Woodruff, of Philadelphia. Copies may be obtained from the secretary at \$1 each.

The book contains all the formal papers read at the Milwaukee convention, and an accurate report of the discussions. Eighteen subjects were treated, among which are: "The Influence of Public Service Corporations on City Government," by Dr. Washington Gladden, of Columbus, O.; "Dangers of the Commercial Spirit in Politics," by Hon. Bird S. Coler, New York; and three papers on "Uniform Municipal Accounting." The volume should be included in every municipal library in the country, and carefully read and digested by the mayor of every city.

* * *

"The Proceedings of the National Conference of Charities and Correction" form a volume of nearly 500 pages, which should find a place in all municipal libraries, and particularly in the department which has anything to do with the subject of charities and correction. It contains many reports and papers of great value.

* * *

Not long ago our esteemed contemporary, the *Engineering Times*, of London, issued a special number showing up the engineering features of the Paris Exposition. It comprises 280 well-illustrated pages, and can be had for 2s. 6d. by addressing the publishers, P. S. King & Son, Great Smith street, Westminster S. W., London.

* * *

The Saloon in Chicago. II. By Royal L. Melendy. *A Year's Municipal Development*. By Clinton Rogers Woodruff. *American Journal of Sociology*, January.

The Worcester Magazine. A periodical published monthly by the board of trade of Worcester, Mass., and devoted to good citizenship

and municipal development in Worcester. It is well gotten up, and deserves to win.

The Advantages of Public Ownership and Management of Natural Monopolies. By Richard T. Ely. Cosmopolitan, March.

New York Aquarium. By C. L. Bristol. Popular Science Monthly, February.

Charity: Statistics Relating to Public Dependency. By W. P. Letchworth. Sanitarian, February.

Need of a Civil Service Academy. By C. C. Bonney. Open Court, February.

New York Detective Bureau. By R. C. Lewis. Munsey, February.

Glasgow International Exhibition, 1901. Anglo-American Magazine, February.

Housing Question and the London County Council. By C. S. Jones. Fortnightly Review, February.

Higher Grade Board Schools. By J. Fitch. Nineteenth Century Review, February.

Our Public Libraries. Dial, February 1.

Work of Traveling Libraries. By G. Iles. World's Work, February.

Milk Inspection in Leipzig. Sanitarian, February.

Municipal Ownership of Street Railways. By Prof. Frank Parsons. Arena, February.

Sanitary Superstitions. By F. L. Oswald. Chautauquan, February.

How the City Fights the Snow. By T. Waters. Home Magazine, February.

How to Build Tenements. Sanitarian, February.

New Method of Testing Drinking Water. By E. Erdmann. Sanitarian, February.

Water Power Transmission at St. Paul. By C. L. Fitch. Casier's Magazine, February.

MUNICIPAL REPORTS.

AMONG the annual reports received, from some of which liberal excerpts will be found elsewhere in this issue, are the following:

City Engineers' Reports—George A. King, Taunton, Mass.; Capt. Lansing H. Beach, Washington, D. C.; William Jackson, Boston, Mass.; E. A. Fisher, Rochester, N. Y.

Reports of Water Commissioners—Cambridge, Mass.; Schenectady, N. Y.; Middletown, N. Y.

Miscellaneous Reports—Executive Board, Rochester, N. Y.; Annual Message of Mayor Fiske, Mount Vernon, N. Y.; Board of Police, Fall River, Mass.; Manual of City Government, New Haven, Conn.; Board of Health, Lowell, Mass.; Chamber of Commerce, Albany, N. Y.; City Electrical Department, Cambridge, Mass.

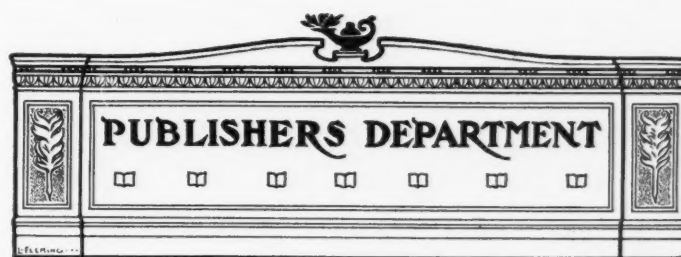
SIDEWALKS AT PUBLIC EXPENSE.

THE village, town and city is becoming more and more interested in the building of improved sidewalks at the public expense. The cement walks seem to be the most favored. Many cities and villages are planning for large improvements during the coming year. Minneapolis, it is reported, will lay at least twenty miles of cement walks this season.

The authorities of the village of Birmingham, Mich., think they have solved the problem, at least as far as "how to do it" is concerned. By a recent action of the council it is decreed that hereafter all walks shall be constructed of artificial stone, and under the direction and supervision of the village authorities. The property owners will be charged for the same at the rate of six cents per square foot, and all expense above that amount will be defrayed by the village.

The city of Springfield, Ill., recently passed ordinances requiring the construction of cement sidewalks on several streets. The necessary funds are to be raised by assessing the cost of construction against abutting property owners.

Seattle, Wash., has a most potent reason for favoring the construction of sidewalks at public expense. During the past twelve months, asserts a local paper, damage suits arising from defective sidewalks have been filed against the city, the claims of which aggregate more than \$160,000. For this and other reasons the city authorities are pushing the public sidewalk improvement scheme with all possible force. As a result of these conditions it is probable that many miles of cement sidewalks will be constructed during the ensuing year.



FOOT, CANAL, BIKE OR TRAIN?

To get from New York to Buffalo? Well, there are many ways. One can walk or ride in a canal boat or bike it. If you want to go by rail, the old, but rejuvenated Lackawanna Railroad is all right. Its 10 A. M. train from New York cannot be excelled. Passing through, as it does, some of the most picturesque parts of the Appalachians, its scenery is magnificent, while its roadbed is perfect, its speed good, its reliability, comfort and courtesy all that could be desired. New blood has entered into its management, and its virility is the marvel of the railroad surprises of the past decade.—*Richmond Co. (N. Y.) Democrat.*

STEEL ELECTION HOUSES.

UNDER the reform ballot law it is oftentimes difficult to obtain rooms in all districts, and besides it is frequently necessary to take rooms which are illy adapted to the needs, and many times rooms which lack light and ventilation are taken. To meet a real and long felt want, the American Steel House Company, 796 Eleventh avenue, New York City, has placed on the market a portable steel house which is adapted to the election laws of any State and meets all requirements and which is, at the same time, comparatively inexpensive.

This company also manufactures many other requisites for the holding of elections under the reform laws, as well as many articles which are absolute necessities of the up-to-date city. A fully illustrated catalogue will be sent upon request.

MONTAUK MULTIPHASE CABLE.

The Montauk multiphase cable is being extensively introduced for bell service and other ordinary household electric wiring purposes, the principal merit claimed being that when placed on the "danger lines," i. e., in the neighborhood of furnaces, kitchen ranges, closets, elevator shaft pits and rubbish receptacles, it will give notice of a fire to any point where the occupant has located the alarm gong or gongs. It is thus serviceable in notifying tenants in dwellings, hotels or apartment houses of the breaking out of a fire and so reducing to a minimum the possible loss of life. The cable company has been a persistent applicant for recognition by the New York Board of Fire Underwriters, the individual members of which, while conceding the merit of the wire, were unwilling to indorse any patent device however commendable by name. At a recent meeting the Committee on Patents submitted a report recommending for approval of the board a fire-detecting wire for the purposes above described as a valuable adjunct in saving human life, and without a dissenting voice the board adopted the committee's recommendation. The wire described is well understood to be that of the Montauk Multiphase Cable Company.

GARBAGE WAGONS WHICH SAVE MONEY.

THE up-to-date garbage wagon will save money for the city. This is a fact which has been demonstrated in several cities. By the use of the ordinary style of garbage wagon money is lost because the size of the load is greatly limited, whereas with the modern wagon a larger load may be carried at less expense. Among the various wagons constructed to meet the various needs of a city there is none that gives better results than that manufactured by the Shadbolt Manufacturing Company, of Brooklyn, N. Y.

This company is now building a truck to be used on the subway in New York City, which is calculated to stand the strain of having broken rock dropped into the body from a distance of eight feet, and some of the pieces of stone will weigh 150 pounds. The Shadbolt wagon is built for the roughest kind of service and is adapted to the needs of the modern city.

STREET LIGHTING PROBLEM SOLVED.

For a long time the electric arc light, used in street lighting, was exceedingly popular, but as soon as the novelty wore away, it began to be discovered that the well-shaded streets were not as well lighted in summer time as formerly with the ordinary gas lamp.

What to do to better the situation was an unsolved problem until the advent of the incandescent gas lamp burners. With the use of this modern invention, economy and efficiency were at once secured, for it was found, by those who resorted to the use of the new lamp, that the street was not only better lighted, but at a much less expense. That was demonstrated some few years ago, and the work of making this improvement goes merrily on. Cities, large and small, from the size of New York to the small city of 5,000 population, continue to install the incandescent gas lamp system.

The above is the substance of an account in *The Times*, of Hornellsville, N. Y., telling how some of its densely shaded streets were transformed from darkness to light by the use of the incandescent gas lamps of the Boulevard Globe and Lamp Co., of 88 Warren street, New York City.

A NOVEL STEAM GENERATOR.

A NOVEL steam generator has recently been introduced by the Parker Engine Company, of San Francisco and Philadelphia. The peculiar novelty in the design is a regenerative system whereby a positive flow of water and steam is maintained in one direction in the tubes of the generator and many advantages secured. The generator is suspended independent of the brick work, as may be easily understood from the illustration. The upper drum is for dry steam while the lower drum is suspended in the steel framework in each end, and carries the upper arm on flanged necks. The main heating surface consists of horizontal tubes arranged in vertical groups, called by the makers "elements," so as to form essentially a number of flattened coils. In the generator shown the elements are eight in number, two tubes wide and each consisting of fifteen straight steel tubes three inches in outside diameter, and eighteen feet long. These are expanded into junction boxes at the end, the whole being exceedingly accessible and easy to keep clean. It is claimed that in this system there is always circulation water entering the inclined tubes at one end of the system and coming out as steam at the other end. The generator looks as if it would have some advantage for quick work where it is necessary to make steam rapidly. It is in use already in a considerable number of important plants.

TO HAVE MUNICIPAL LIGHT PLANT.

THE enterprising town of Wellesley, Mass., has engaged the well-known firm of T. C. Perkins & Co., of Hartford, Conn., to prepare plans for and superintend the construction of a new municipal lighting plant. For some years the town has owned the poles, wires and distributing system, purchasing its electricity from a private plant in an adjoining town, but the demand for increased service for both street and commercial lighting has demonstrated to the authorities that it will be more profitable to own and operate its own plant. It already owns its own water plant, and proposes to combine

the power station for the new lighting system with that used for the water. The new plant will be modern in every respect, and will have a capacity of supplying 600 twenty-five candle power incandescent street lights and an equivalent of 5,000 commercial lights.

"IMPROVEMENT THE ORDER OF THE AGE."

Is the motto of the Smith Premier Company, of Syracuse, N. Y. This company is living up to its motto, not only in the improvement of its famous typewriter, but also in the advancement of the interests of the general public in up-to-date appliances which expedite office work of every description.

The company has recently removed its New York offices from 337 to 338 Broadway, where, under the management of W. H. Durphy, it has one of the finest equipped branch offices in the country. Its employment bureau has been improved and enlarged, and its value to the public enhanced. In the meantime it has not forgotten to look after the comfort and convenience of the operators who are looking for positions. The waiting room of the operators is fitted up with easy seats, supplied with current literature, with machines and a high grade instructor, who stands ready to answer all questions or lend a helping hand when necessary.

ENAMELED IRON STREET SIGNS.

JUDGING from the number of cities now using enameled iron signs for naming the streets, it would seem that at last something has been put on the market which is satisfactory: it has always been the cause of some considerable debate by the city authorities just what kind of a sign they could get which could be distinctly seen and at the same time lasting. Enameled iron signs, it is claimed, will last from fifteen to twenty years. As the name "enameled iron" implies, the signs have for a background a sheet of iron to which is applied an enamel and then fired to a white heat. It is not, therefore, liable to fade out from the sun's rays, as the old style of painted signs did. People in Detroit living in the vicinity of the site of a warehouse which was burned to the ground a year or two ago, point to a street name made of enameled iron which is now on the fence enclosing the debris, and say that it is the same sign which was formerly attached to the warehouse and found later among the ruins. Besides the Baltimore Enamel Company, of 190 West Broadway, New York, there are only one or two other manufacturers of these signs now in this country.

"TO WHOM IT MAY CONCERN."

"CHICAGO, Ill., Feb. 20, 1901.

"It having frequently come to my notice that Ira H. Jewell, my son, is representing himself as identified with the 'Jewell Filter,' manufactured by the O. H. Jewell Filter Co., and with myself as his financial backer, I find it necessary to publicly state that the said Ira H. Jewell has had no connection whatever with the O. H. Jewell Filter Co. since selling his stock interest therein over one year ago, and never with its successors in the filter business, the New York Continental Jewell Filtration Co., nor has he any business relations with me of any description.

"Any statements of his, or those of his representatives, that he is authorized to do business of any sort for the O. H. Jewell Filter Co., or its successors as above, are unqualifiedly false and without foundation, and if made, are done with the deliberate intention to deceive.

"Respectfully yours,

"(Signed) O. H. JEWELL.

"Western General Manager, N. Y. Continental Jewell Filter Co."

"We would call the attention of those interested in filters to the name of Ira H. Jewell's company, the I. H. Jewell Filter Company, as it is so much like the O. H. Jewell Filter Company as to be misleading. The I. H. Jewell Filter Company has no connection whatever with the O. H. Jewell Filter Company or the New York Continental Jewell Filtration Company, nor with the Standard Jewell Filter, which we manufacture and sell and the patents of which we control."

THE VOTING MACHINE IN BINGHAMTON.

At a recent special election held in the city of Binghamton, N. Y., the Bardwell Votometer was used. City Clerk Hull declares the working of the machine an unqualified success, and says that the result of the election was placed in his hands one and a quarter minutes after the polls were closed.

The chairman, inspectors and election officers of the thirteenth ward, in which the election was held, certified after the election was over to the following: "The use of the Bardwell Votometer in the election in the thirteenth ward of this city was an absolute and unqualified success. The voters in said ward operated the Votometer with absolute ease, and it gave universal satisfaction. The reliability and accuracy of this machine was shown to be one of its strongest characteristics. Basing our judgment on the experience had with the Votometer in actual election work, we unqualifiedly endorse it, and heartily recommend its use in all elections to be held in this city." These officers are Emera A. Cobb, chairman; R. M. Warner, W. A. Smith, Frederick Colsten, Charles V. Bogert, B. E. King and A. S. Van Scoten.

REMARKABLE TYPEWRITING.

CITY officials, and particularly city clerks, appreciate good typewriting. Some of the latter have gone so far as to have paper specially ruled for the minutes of the proceedings of council, so that they could be typed on loose sheets and then, at the end of the year, bound in one or more volumes. City Clerk Deitrick, of Wilkesbarre, Pa., has such a method in operation, and it has worked to his complete satisfaction.

Those who wish to follow his example will be interested in the following paragraph from the Fall River (Conn.) *Evening News*, of recent date: "The report of the city auditor for 1900 is again a work of remarkable typewriting. It was typewritten by James G. Manchester, formerly auditor's clerk, and now located in New York. He is an expert in a class almost by himself in fine typewriting, and his arrangement and production of the auditor's annual reports for the past seven or eight years have always excited admiring comment. Each year's book surpasses that of the previous year in perfection of detail and finish. The title page for 1900, with a border done in colors, is a work of art."

It is sufficient to say that this work was performed on the Hammond typewriter, a machine which is particularly well adapted to the work of the city official. Full particulars will be mailed on application to the Hammond Typewriter Company, 167 Broadway, New York City.

THE SPRAGUE ELECTRIC COMPANY

REPORTS AN INCREASE OF SALES OVER THE CORRESPONDING MONTH LAST YEAR. The outlook for this year is exceedingly bright. Among recent orders are one 75 H. P. and four 30 H. P. motors for the Cooke Locomotive and Machine Co., Paterson, N. J.; thirty-five motors for the Central Lard Co., New York, who placed the order through their electrical engineers, Messrs. Floy and Carpenter; one 400 K. W. generator, one 100 H. P. motor, and six 80 H. P. motors, in addition to a number of small motors for the Wellston Portland Cement Co.; an order placed by Mr. George Hill, 150 Fifth avenue, New York, for the Dunmore Iron and Steel Company, Dunmore, Pa., consisting of one 62½ K. W. generator, one 100 K. W. generator, and twenty-five motors of assorted sizes; one 75 K. W. generator, one 25 H. P., and one 30 H. P. motor for the National Distilling Company, Milwaukee; one 125 K. W. generator for the Big Muddy Coal and Iron Company, Murphysboro, Ill.; one 100 K. W. generator for the Keystone Leather Company, Camden, N. J.; seventeen motors for the Norfolk Navy Yard; one 50 K. W. and one 75 K. W. engine type generators for the new Windsor Arcade Building, New York; two 75 K. W. engine type generators for the new city prison Blackwell's Island; two 100 K. W. engine type generators for the Manhattan State Hospital, Central Islip, and two 300 K. W. 500 volt street railway generators for the Central States Construction Company, Chicago.

A BELLAMY SCHEME REALIZED.

ONE of the latest co-operative schemes is the incorporation of the town of Wardenlyffe, L. I., which promises soon to grow into a city. The area includes 3,500 acres, which is equal to that of some English cities. It is already supplied with an electric lighting system, an artificial ice plant, and other modern conveniences.

Its patrons will, necessarily, be confined to the wealthier class, or, at least, the well-to-do, as no one will be allowed to become a member of the corporation who is not able to construct and maintain a home costing at least \$5,000. This sum is set as a minimum limit. Already several houses have been constructed far exceeding that amount in original cost.

This plan includes a well conducted farm, dairy, etc., from which the members are to be supplied with its products at the lowest market price. A hunting preserve, well stocked with all kinds of game, open only to the use of members, is also a feature. William T. Raymond, 41 Cortlandt street, New York City, is a member of the corporation, and can give any particulars which may be desired.

ON IN NEW YORK: OFF IN ST. LOUIS.

THE Lackawanna Railroad, in connection with the Wabash, is operating a magnificent service between New York and St. Louis and the West and Southwest.

In the Lackawanna train which leaves New York at 10 o'clock every morning will be found a Pullman sleeping car of the latest style and thoroughly up-to-date in point of luxury, comfort and convenience. This train, the Lackawanna Limited, divides the honor with the corresponding eastbound train of being the finest in the service of the Lackawanna Railroad. It makes the trip from New York to Buffalo during a summer day, and a traveler has before him a continuous panorama of scenery which is acknowledged to be unsurpassed along any railroad in America. This scenery is the more attractive because Lackawanna locomotives, which burn hard coal, emit no smoke, and the Lackawanna's roadbed being stone-ballasted, produces no dust. The dining-car service on this train is admitted to be second to none in the world, either in point of excellence or in point of service. Meals are served during the entire day, on the a la carte plan, patrons of the cars paying only for what they order.

MODERN FIRE APPARATUS.

THE United States is rightly called the "fire country," because it has a larger fire loss each year than any other nation of its size in the world. While it has reason to be ashamed of this fact, it has as great reason to be proud of its fire laddies, for there are none to equal them.

The firemen in their turn must salute the modern manufacturer of the apparatus which makes their achievements possible. Among the many manufacturers of fire apparatus none turn out better work than the Seagrave Company, of Columbus, O.

As an evidence of the superiority of the work of this popular corporation, which, by the way, is not in the "trust," the large increase in the number of its orders has made it necessary to enlarge its plant. The building recently added to the factory is 300 feet long and 50 feet wide, built in the most substantial manner, with 24-inch walls. It is particularly adapted to the construction of heavy fire apparatus.

At the present writing the company is crowded with orders for its product. An inspection of its order books shows that it has either just delivered, has under construction, or now ready for delivery, invoices of its products going to nearly 100 villages, towns and cities in the United States, and a large number of orders to be shipped from its Canadian factory at Walkerville. Many of these orders include the Seagrave aerial ladder, which is so constructed that it can be raised by one man in ten seconds. This ladder is one of the most remarkable pieces of modern fire apparatus ever invented. It is safely and positively locked at any point in its erection, and is ready for instant use. As the makers say, "There is no gas to give out, no air to leak, and no chemicals to fail, used in its operation; it is just made of cold steel and common sense."

MUNICIPAL BOND SALES FOR FEBRUARY.

THE boom in municipal bonds seems to be on the wane. The sales in January were less than for the corresponding period the year before, and the sales during February have been less than for any similar period during the last five years. There is no indication, however, that this is permanent.

The following table is made up of the principal municipal bond sales that have been reported during the month of February. There are many temporary loans included in the table this month, which will interest the readers of THE JOURNAL, on account of the varying rate of interest and the price paid.

Purchaser.	City and bonds.	Int. rate.	Term, years.	Amount.	Price.
Albany Savings Bank.....	Albany, N. Y., Refunding Water	3 1-2 S. A.	1-20 S.	\$104,000	104
Albany Savings Bank.....	Albany, N. Y., Beaver Park	3 1-2 S. A.	1-20 S.	10,000	104
Albany Savings Bank.....	Albany, N. Y., Free Public Bath.....	3 1-2 S. A.	1-20 S.	10,000	104
American Exchange National Bank, Cleveland.....	Cuyahoga, O., Temporary loan.....	5 S. A.	1	50,000	
American Savings Bank, Local.....	Lincoln, Neb., Repaving.....	5 A.	1-10 S.	31,000	100.16
Barber Asphalt Co.....	Lincoln, Neb., Repaving.....	5 A.	1-10 S.	11,500	100.75
Blake Bros. & Co., Boston.....	Salem, Mass., Temporary loan.....	3	8 mos.	50,000	
Bond Commissioners.....	Macon, Ga., Bridge.....	3		70,000	Par.
Bond & Goodwin, Boston.....	Gloucester, Mass., Temporary loan.....		8 mos.	50,000	
Bond & Goodwin, Boston.....	Somerville, Mass., Temporary loan.....	3-30	6 mos.	200,000	
Bond & Goodwin, Boston.....	Springfield, Mass., Temporary loan.....	3-12	9 mos.	300,000	
Bucyrus City Bank.....	Bucyrus, O., Funding.....	5 S. A.	1-12 S.	6,000	107.983
Campbell, Wild & Co., Indianapolis.....	Frankfort, Ind., Electric Light.....	4 S. A.	5-9 S.	25,000	100.46
Capital National Bank, Local.....	Indianapolis, Ind., Fire Dept. & City Hospital.....	3 1-2 S. A.	5-5 Avg.	143,000	101.234
Capital National Bank, Local.....	Indianapolis, Ind., Temporary loan.....	3	4 mos.	40,000	
City Controller.....	Buffalo, N. Y., City.....	3 S. A.	1	3,567	
Cornelius, R. E., Local.....	Youngstown, O., Belmont Ave. Paving.....	5 S. A.	6 1-6 Avg.	42,960	109
Cornelius, R. E., Local.....	Youngstown, O., Market St. Paving.....	5 S. A.	3-2-3 Avg.	3,950	105.10
Cornelius, R. E., Local.....	Youngstown, O., Hazel St. Paving.....	5 S. A.	3-2-3 Avg.	3,400	105.10
Cornelius, R. E., Local.....	Youngstown, O., So. Phelps St. Paving.....	5 S. A.	3-2-3 Avg.	2,250	105.10
Cornelius, R. E., Local.....	Youngstown, O., West Ave. Grading.....	5 S. A.	3-2-3 Avg.	1,950	105.14
Cornelius, R. E., Local.....	Youngstown, O., Mt. Pleasant St. Grading.....	5 S. A.	3-2-3 Avg.	1,500	105.15
Cornelius, R. E., Local.....	Youngstown, O., Smith St. Grading.....	5 S. A.	3-2-3 Avg.	700	105.10
Cornelius, R. E., Local.....	Youngstown, O., Murdock St. Guttering.....	5 S. A.	2-2-3 Avg.	275	103.24
Dunscomb & Jennison, New York.....	New Haven, Ct., Temporary loan.....	3	5 & 6 mos.	175,000	
Dunscomb & Jennison, New York.....	New Haven, Ct., Temporary loan.....	3-35		50,000	
Dunscomb & Jennison, New York.....	Troy, N. Y., Temporary loan.....	3 1-2	8 mos.	100,000	
Farson, D. N., Chicago.....	Beaumont, Tex., Public Improvement.....	5 S. A.	20-40 Op.	115,000	
Farson, D. N., Chicago.....	Alva, Okla., Water.....	6	30	10,000	
First National Bank, Local.....	Canton, O., Temporary loan.....	4-90	1	5,000	
Gay, E. H., & Co., Boston.....	Stamford, Conn., Funding.....	3 1-2 S. A.	20	60,000	
Gay, E. H., & Co., Boston.....	Stamford, Conn., Sewer Redemption.....	3 1-2 S. A.	20	25,000	
Harris, N. W., & Co., Boston.....	Concord, Vt., Refunding Water.....	4 S. A.	16-20 Op.	24,000	
Harris, N. W., & Co., Boston.....	Taunton, Mass., Water.....	4 S. A.	19	15,000	
Hayes, W. J., & Sons, Cleveland.....	Fairport, O., School District.....	4 S. A.	1-12 S.	12,000	
Hayes, W. J., & Sons, Cleveland.....	Findlay, O., Sewer.....	4 S. A.	1-2-10 S.	25,000	
Hayes, W. J., & Sons, Cleveland.....	Talledega, Ala., Light & Water.....	5 S. A.	30	50,000	
Hayes, W. J., & Sons, Cleveland.....	Fostoria, O., Refunding.....	4 S. A.	20	12,500	
Hayes, W. J., & Sons, Cleveland.....	Weehawken, N. J., School.....	4 S. A.	24 5-6 Avg.	70,000	
Dick Bros. & Co., Philadelphia, Pa.....	Jeanette, Pa., Paving & Sewer.....	4 1-2 S. A.	20 5-6 Avg.	120,000	109.85
Home Savings Bank, Albany.....	Johnstown, N. Y., No. Perry St.....	5 A.	2 5 1-2 Avg.	31,327	104.10
Hooker, Nickerson & Co., Hartford.....	Bay City, Mich., Refunding.....	4 A.	30	20,000	
Highland Co. Bank, Local.....	Greenfield, O., Water Works & Electric Light.....	4 S. A.	5 3-4 Avg.	10,000	101.01
Jose, Parker & Co., Boston.....	Enfield, Ct., Refunding Notes.....	3-14	25	30,000	Par.
Keane, S. A., Chicago.....	Morgan City, La., Town.....	5 A.	25	10,000	100.25
Keane National Bank.....	Hinsdale, N. H., Town Hall.....	3 1-2 S. A.	35 1-2 Avg.	20,000	104.50
Kilmer, J. M. & W. S., Local.....	Binghamton, N. Y., Fire Station.....	3 1-2 S. A.	6 mos.	15,000	109.65
Kingston Savings Bank.....	Kingston, N. Y., Paving Notes.....	4	5-16 S.	1,635	Par.
Kleybolte, Rudolph & Co., Cincinnati, O.....	Pentwater, Mich., Public Park.....	5	4-29 S.	6,000	
Lamprecht Bro. Co., Cleveland.....	Wellsville, O., Sewer.....	4 S. A.		65,000	
First National Bank, Local.....	Chippewa Falls, Wis., Refunding.....	5		30,000	
Lunt, C. S.....	Rochester, N. Y., Notes.....	3-44	3 mos.	175,000	
McClure, F. F., & Sons.....	Evanston, O., Langdon Ave. Improvement.....	5 A.	1-10 S.	21,098	
McClure, F. F., & Sons.....	Evanston, O., Woodburn Ave. Improvement.....	5 A.	1-10 S.	7,433	104.995
McClure, F. F., & Sons.....	Evanston, O., Kerper Ave. Improvement.....	5 A.	1-10 S.	7,742	
Minn. Loan & Trust Co., Minneapolis.....	Walhalla, N. D., Water Works.....	6 A.	15	2,700	103
Monroe Co. Savings Bank.....	Rochester, N. Y., Notes.....	3-14	8 mos.	50,000	
Moseley, F. S., & Co., Boston.....	Worcester, Mass., Temporary loan.....	3	8 mos.	200,000	
National Bank of Orange.....	Culpepper, Va., Refunding.....	4	20-30	35,000	100.75
National Shawmut Bank, Boston.....	Massachusetts Temporary loan.....	2-96	9 mos.	1,000,000	
New First National Bank, Columbus, O.....	Haviland O., Street Improvement.....	6 S. A.	1-5 S.	1,000	
N. H. National Bank, Local.....	Portsmouth, N. H., Temporary loan.....	4 1-2		26,600	
O'Rourke, John M., Contractor.....	Denver, Col., Capitol Hill Storm Sewer District.....	6		1,700	
Palmer, J. H., Contractor.....	Danville, Ill., Sewer.....	6	1-4	1,200	
Peoples Trust Co., Brooklyn.....	Albany, N. Y., Improvement.....	3 1-2 S. A.	1-5 S.	65,000	101.11
Reed, Merry & Co., Local.....	Bowling Green, O., Sewer Assessment.....	4 S. A.	5 3-4 Avg.	10,000	102.75
Rochester Savings Bank.....	Rochester, N. Y., Notes.....	3-50	8 mos.	310,000	
Rogers, Newman & Tolman, Boston.....	Calais, Me., City.....	4 S. A.	15	9,000	109.42
Rollins, E. H., & Sons, Denver.....	Colorado Springs, Col., Refunding.....	4 S. A.	15-30 Op.	190,000	
Rollins, E. H., & Sons, Boston.....	Dedham, Mass., Sewer.....	4 S. A.	1-40 S.	120,000	
Rollins, E. H., & Sons, Boston.....	Columbus, O., School District.....	3 1-2 S. A.	20 Avg.	85,000	
Schrivver, H. A., Minneapolis.....	Herman, Minn., Water Works.....	4 1-2 A.	20	7,200	100.52
Seasongood & Mayer, Cincinnati.....	Portsmouth, Va., Fifth Ward Paving and Grading.....	4 S. A.	30	50,000	
Seasongood & Mayer, Cincinnati.....	Carthage, O., Sidewalk.....	5 A.	1-10 S.	1,663	
Seasongood & Mayer, Cincinnati.....	Evanston, O., Brooks Ave. Improvement.....	5 A.	1-10 S.	4,523	
Seasongood & Mayer, Cincinnati.....	Fern Bank, O., Cement Sidewalk.....	5 A.	1-10 S.	1,189	
Seasongood & Mayer, Cincinnati, O.....	Fern Bank, O., Cement Sidewalk.....	5 A.	1-10 S.	506	
Second National Bank, Cumberland.....	Woodstock, Va., Water.....	4 S. A.	20-30 Op.	20,000	
Shepard, E. D., & Co., N. Y.....	Charlotte, N. C., School Funding.....	4		40,000	
Sherrill, I. W., Poughkeepsie.....	Fort Edward, N. Y., Judgment.....	4 S. A.	5-22 S.	18,000	107.67
Sinking Fund Trustees.....	Columbus, O., Hoover Ave. Improvement.....			3,000	
Sinking Fund Trustees.....	Columbus, O., Tulip Alley Improvement.....			1,200	
State Treasurer.....	North Adams, Mass., Refunding.....	3 1-8	20	30,000	Par.
Stein, M. A., New York.....	Yonkers, N. Y., Assessment.....	4	2	29,000	
Stein, M. A., New York.....	Otsego, N. Y., Refunding R. R. Aid.....	3 1-2 S. A.	17 Avg.	7,500	
Stein, M. A., New York.....	Schenectady, N. Y., Notes.....	4 A.	1-4 S.	34,489	
Stein, M. A., New York.....	Yonkers, N. Y., School.....	3 1-2 S. A.	19 1-12	3,900	
Stoddard, Nye & Co., Minneapolis.....	Buffalo Lake, Minn., Water Works.....	5 S. A.	15	6,000	102.666
Tiffin National Bank.....	Tiffin, O., Refunding.....	4 S. A.	10	10,700	104.289
Thompson, Tenney & Crawford, New York.....	Kingston, N. Y., Refunding Railroad Aid (gold).....	3 1-2 S. A.	5 1-2 Avg.	22,000	
Thompson, Tenney & Crawford, New York.....	Paterson, N. J., Permanent Street Improvement.....	4 S. A.	10	150,000	
Trowbridge & Niver Co., Chicago.....	Holland, Mich., Park.....	4 A.	30	50,000	
Unknown.....	Algonac, Mich., Funding, Electric Lgts & Water Wks.....			8,000	
Unknown.....	Grand Rapids, Mich., Bridge.....	6	5	3,500	101
Unknown.....	Minneapolis, Minn., School District.....	3	6 mos.	70,000	
Unknown.....	Newfield, N. Y., Refunding.....	3 1-2 S. A.	12 Avg.	45,000	
Unknown.....	Ovid, N. Y., Refunding.....	3 1-2		60,000	
Unknown.....	Red Bank, N. J., School District.....	4 S. A.	6-35 S.	60,000	106
Unknown.....	Shawneetown, Ill., City.....	5	20	26,000	
Unknown.....	Ulysses, N. Y., Refunding.....			50,000	
Unknown.....	Westchester, Pa., Water.....	3 1-2		5,000	
Walden Savings Bank.....	Walden, N. Y., Village.....	3 1-2	1 1-2-13 1-2 S.	13,000	102.04
White, George C., Jr., New York.....	Fall River, Mass., Municipal.....	3 1-2 S. A.	10	133,000	